IMPERIAL BUREAU
14 JUNE 1930
OF MYCOLOGY

SOUTHERN RHODESIA.

REPORT

OF THE

Secretary, Department of Agriculture,

For the Year 1929.

Presented to the Legislative Assembly,
1930.

Salisbury, Rhodesia:
Printed by the Government Printer.

[C.S.R. 26—1930.] 1930. 1325—650.14.3.30

SOUTHERN RHODESIA.

Report of the Acting Secretary, Department of Agriculture, for the Year 1929.

Presented to the Legislative Assembly,

1930.

Owing to the fact that my association with the Department dates from approximately the middle of the year only, I have to depart from the usual custom, and shall not attempt to discuss the agricultural position in detail.

The year under review, although not presenting very striking agricultural development, has been nevertheless a period which promises to have important results on the farming industry of the Colony.

Almost every farmers' meeting, conference or congress has been occupied with questions concerning the building up of or maintaining soil fertility; the development of the sandveld areas; the problems connected with the best means of securing markets or other economic questions regarding the business side of farming.

Many farmers have made a decided advance in changing over to a much broader farming programme, and it is extremely gratifying to note that there is every possibility of cotton coming back to fill a useful place as a rotation crop at least. The progress which has been made is evident from the Report of the Cotton Specialist, which follows. This refers to the work which continues at the Gatooma Cotton Breeding Station by officers appointed by the Empire Cotton Growing Corporation to work under the direction of Major G. S. Cameron.

A number of new services were undertaken during the year and details will be found in the Chief Technical Officers' Reports, which follow. These include the Pasture Research investigations, which are outlined in the Chief Chemist's Report; the Official Milk Recording Scheme, particulars of which will be found in the Dairy Adviser's Report; the extending of the control measures for Tsetse Fly, dealt with by the Chief Entomologist; a definite start has been made in securing accurate costs of production and an interesting account of the work conducted at the Gwebi Farm is included in the Chief Agriculturist's Report; the Government policy of slaughtering East Coast Fever cattle, adopted early in the year, and entirely supported by the resolutions of the Pan-African Veterinary Conference in Pretoria in August, promises extremely beneficial results, and has been strongly supported by the farming community.

Three new services were approved, but will only come into being early in the New Year. These are the Matopo School of Agriculture, the Tobacco Research Station and the Sandveld Experiment Station.

The activities of the various branches of this Department are plainly indicated in the Reports of the Chief Technical Officers which follow, but there still remain a few items of importance which do not fall within the cope of any branch.

Staff.—A considerable number of Staff changes were made during the year, and the following additional technical appointments were made to meet urgent requirements:—

Tobacco Adviser.
Assistant Chemist.
Irrigation Reconnaissance Officer.
Game Warden.
Assistant Dairy Officer.
Two Assistant Poultry Officers.

One Entomologist resigned to take up an appointment in the Colonial Service.

An Agriculturist was retired for health reasons, and the Poultry Expert on reaching pensionable age.

Pasture Research.—A grant of £2,500 for capital expenditure and £2,500 per annum for three years, has been granted to this Department by the Empire Marketing Board on the pound for pound principle, for research on the mineral content of natural pastures, with special reference to certain deficiencies in soil, and their effect on the growth and development of livestock.

Two officers were appointed as field workers, and were sent to the Rowett Institute, Aberdeen, for a short period of training. They returned on the 1st November.

The investigation is to be carried out under the direction of the Chief Chemist, and an outline of the projected investigations will be found in the Chief Chemist's report.

It was found to be impossible to make an actual start with this work before the return of the two field workers, and it is hoped that the grant for three years may count from the 1st November, 1929, rather than from April last, when the arrangement with the Empire Marketing Board was concluded.

About 400 acres have been set aside on the Matopos Agricultural School Farm, and a similar amount is to be allocated for this investigation on the portion of the Lendy Estates, recently purchased as a Sandveld Experiment Station.

IMPORTATION OF PEDIGREE STOCK.

A scheme is now operating, under which persons desirous of importing pedigree stock are assisted to the extent of the cost of the freight to Cape Town and railage thence to the destination in this Colony. The cost of this assistance is borne equally by the Government of Southern Rhodesia and the Empire Marketing Board.

At the present time the total number of pedigree animals which have been imported in this way is 138, of 98 of which it is possible to give the following interesting figures. The balance consists of 38 beasts imported privately, and two which died before delivery. The breeds and sexes are as follows:—

Breed.	Bulls.	Heifers.	Total.
Sussex	13	2	15
Red Poll	6	30	36
Ayrshire	8	22	30
Shorthorn	19	12	31
South Devon	3	—	3
Lincoln Red	3	—	3
Jersey	1	10	11
Hereford	3	2	5
Aberdeen-Angus	2	—	2
	58	78	136
Suffolk Sheep	2 rams		2
Total			138

Details of Costs.—The following figures were supplied by Mr. T. J. Needham, Accountant of the Department:—

For the reason stated above, costs are available at present for only 96 head and the two sheep. The following is a statement showing the total cost of importing 96 head of pedigree cattle and two rams purchased in the United Kingdom by the Government Stock Adviser, Mr. W. Fleming, who went to England for that purpose:—

CATTLE 96 HEAD.

Payable by Importers.

	£ s. d.		%
Purchase price	4,724 0 6	.....	44.22
Insurance	1,088 6 3	.....	10.19
Incidentals	1,692 15 2	.....	15.85
Sub-total	£7,505 1 11	.....	70.26

Payable by Southern Rhodesia Government and Empire Marketing Board.

	£ s. d.		%
Freight London to Cape Town	2,822 8 0	.....	26.42
Railage Cape Town to Destination	354 6 7	.....	3.32
Total	£10,681 16 6	.....	100.00

SHEEP 2 HEAD.

Payable by Importers.

	£ s. d.		%
Purchase price	27 6 0	.....	34.79
Insurance	4 9 8	.....	5.71
Incidentals	23 5 3	.....	29.64
Sub-total	£55 0 11	.....	70.14

Payable by Southern Rhodesia Government and Empire Marketing Board.

	£ s. d.		%
Freight London to Cape Town	21 0 0	.....	26.76
Railage Cape Town to Destination	2 8 8	.....	3.10
Total	£78 9 7	.....	100.00

DETAILED FIGURES.

The figures relative to the most expensive and the cheapest animals purchased are as follow:—

City of Agra Shipment.

Costs relative to one bull.

	£ s. d.		%
Purchase price	200 0 0	.....	72.04
Freight London to Cape Town	29 8 0	.....	10.59
Insurance	27 2 4	.....	9.76
Quarantine Fees	4 8 4	.....	1.59
Veterinary Fees	1 1 0	.....	0.38
Railage to Docks	1 19 9	.....	0.72
Incidentals London	1 0 9	.....	0.38
Incidentals Cape Town	7 0 8	.....	2.54
Railage to Rhodesia	5 10 8	.....	2.00
	£277 11 6	.....	100.00

Harmodius Shipment.

Costs relative to one heifer.

	£ s. d.		%
Purchase price	27 0 0	.....	32.69
Freight London to Cape Town ...	29 8 0	.....	35.60
Insurance	8 14 2	.....	10.53
Railage to Docks	2 3 8	.....	2.67
Veterinary and Quarantine Fees ...	4 13 10	.....	5.69
Incidentals London	1 8 9	.....	1.75
Incidentals Cape Town	5 19 7	.....	7.20
Railage to Rhodesia	3 4 0	.....	3.87
	£82 12 0	.....	100.00

A comparison between one high-priced and one low-priced animal reveals the fact that, whereas the purchase price of the first one was seven and a half times that of the second one the landed cost of the first one was three and a third times the landed cost of the second one. This is due to the fact that with the exception of insurance all other charges are constant and bear no relation to the original cost. Insurance varies as the purchase price.

Out of the total number of 138 head imported there were two deaths prior to delivery, which were covered by insurance. Both animals reacted to the Tuberculin Test at Cape Town and were destroyed.

It will be noticed from the foregoing that the average cost of importation is for each head of cattle £62 1s. 2d., of which sum £28 19s. 4d. is borne by the importer and £33 1s. 10d. by the Southern Rhodesia Government and the Empire Marketing Board in equal shares.

FINANCIAL ASSISTANCE TO FARMERS.

During the last four years a large amount of money has been voted by Government to afford financial assistance to farmers. This is allocated to various loan funds administered by committees of this Department. The Accountant has prepared statements showing the amounts involved and the position of the loan funds at the end of the year under review.

The Balance Sheet—which is not yet audited—shews the financial position of the various loan funds as at 31st December, 1929.

It will be noticed that the account is liable to Treasury for a total sum of £114,992 9s. 11d. for capital advanced for loans and also for £206 17s. 1d. for interest actually collected and lodged to the credit of the Loan Account but not yet paid over to Treasury.

A further liability in the sum of £424 16s. 1d. represents deposits standing to the credit of sundry farmers who propose to take up stock loans shortly.

The disposition of the fund is shewn on the Assets side of the Balance Sheet. It should be pointed out that the Stock and Development Loan Funds are of a revolving nature. That is to say as soon as a loan is repaid the capital portion becomes available for reissue. The original development capital of £35,194 has now been loaned and reloaned again to the extent of £82,664, and on 31st December £25,952 was loaned out and the balance of £9,242 reposed in the bank.

Out of this balance of £9,242 the Committee controlling the fund were committed to pay £8,094 and £1,148 was available for issue.

The cash at bank is divisible under the following heads:—

	£ s. d.
Pedigree Stock Loans	5,757 19 4
Farm Development Loans	9,242 1 3
Empire Settlers Loans	2,628 15 2
Necessitous Tobacco Growers Loans ... ... (Repayable to Pedigree Stock Loan Fund).	1,411 13 10
Irrigation Loans	895 2 10
Interest Collected (payable to Treasury)	206 17 1
	£20,142 9 6

The unexpended funds reposing in the bank earn interested calculated from day to day at 1½%.

Against the total available funds in the bank amounting to £20,142 9s. 6d. actual commitments to pay a total of £17,230 9s. 3d. had already been made.

The object constantly before the Committees is to see that the funds available for loans are kept constantly circulating.

STOCK LOANS.

This loan is constantly revolving. The original amount of £28,000 has been reloaned again after repayment to the extent of £49,258 12s 1d. Borrowers are required to deposit one quarter of the cost of the animals before the loan is mad: and the repayment of the remaining three quarters is spread over four years.

Tables are attached lettered "A" and "B." Table "A" shews the numbers and kinds of animals purchased each year since the loan was inaugurated in 1925.

Both as regards male and female stock, Frieslands have proved to be the type most consistently desired by importers.

Table "B" is a summary of Table "A" and shews that one bull is imported under the scheme for every ten cows and every ten sheep.

This class of loan is very popular and albeit not unremunerative to Government as the security is good; losses are negligible and the general improvement in the class of stock as a result of this loan fund must have an increasingly beneficial effect upon the cattle industry of the Colony.

GENERAL.

Table "C" shews the number of persons who have been assisted by the various loans since the commencement of the scheme. On 31st March, 1926, the available funds were in the possession of 193 individuals and after augmentation by fresh Treasury grants the numbers of individuals increased at the end of each successive year to 308,386,561 and on 31st December, 1929, 654 persons were benefiting from Government advances for assistance of farmers.

Up to the present it has only been necessary to write off under the Financial Adjustments Acts a sum of £192 4s. 2d. out of the total amount loaned in the sum of £186,961 0s. 9d. It is true that this does not yet reflect the results of the last two years agricultural depression, but when the effects are revealed it can still be anticipated that the losses will be astonishingly small when compared with the large sum loaned and the remarkably good financial results revealed by the Interest Account.

INTEREST ACCOUNT.

Since its inception in 1925 a total of £11,833 has accrued by way of interest which is charged at 6% per annum. Of this sum the amount collected on account of revenue is £6,677 15s. 5d., the balance being unpaid at date.

Interest on Cotton Ginneries Loans has been waived since the 30th September, 1926, until such time as there is a recovery in the Cotton Growing industry.

AGRICULTURAL LOANS.

Statement shewing the number of Agricultural Loans Granted and Repaid from the Inauguration of the Scheme in 1925 to 31st December, 1929.

	Pedigree Stock.	Farm Development.	Empire Settlers	Tobacco Growers.	Irrigation.	Cotton Ginneries.
Granted 1925/6	69	124	—	—	—	—
Less repaid 1925/6	—	—	—	—	—	—
Current loans, 31st March ,1926	69	124	—	—	—	—
Granted 1926/7	62	112	—	—	—	—
Total	131	236	—	—	—	—
Less repaid 1926/7	3	56	—	—	—	—
Current loans, 31st March, 1927	128	180	—	—	—	—
Granted 1927/8	73	124	—	—	—	—
Total	201	304	—	—	—	—
Less repaid 1927/8	17	102	—	—	—	—
Current loans, 31st March, 1928	184	202	—	—	—	—
Granted 1928/9	106	125	35	24	—	—
Total	290	327	35	24	—	—
Less repaid 1928/9	39	70	2	4	—	—
Current loans, 31st March, 1929	251	257	33	20	—	—
Granted 1929/30	103	95	7	3	9	3
Total	354	352	40	23	9	3
Less repaid 1929/30	32	94	—	1	—	—
Current loans, 31st December, 1929	322	258	40	22	9	3

SUMMARY OF CURRENT LOANS.

	31/12/29	31/3/29	31/3/28	31/3/27	31/3/26
Loans to farmers for purchase of pedigree stock	322	251	184	128	69
Loans to farmers for Farm Development	258	257	202	180	124
Loans to Empire Settlers	40	33	—	—	—
Loans to Necessitous Tobacco Growers	22	20	—	—	—
Loans for Irrigation	9	—	—	—	—
Loans to Cotton Ginneries	3	—	—	—	—
	654	561	386	308	193

AGRICULTURAL DEPARTMENT LOAN ACCOUNT. Balance Sheet as at 31st December, 1929.

LIABILITIES.

	£ s. d.	£ s. d.
Cash drawn from Treasury for—		
Loans to Farmers for Purchase of Pedigree Stock	28,000 0 0	
Less transferred to "Loans to Necessitous Tobacco Growers	3,685 5 9	
	24,314 14 3	
Loans to Farmers for Development	35,194 3 4	
,, to Empire Settlers	11,500 0 0	
,, for Irrigation	2,000 0 0	
,, to Cotton Ginneries	38,298 6 7	
,, to Necessitous Tobacco Growers (Transferred from Stock Loans)	3,685 5 9	114,992 9 11
Interest collected (Not yet paid to Treasury)		206 17 1
Deposits lodged by Farmers on account of cost of stock	13,384 15 5	
Less amounts applied in reduction of loans granted.	12,959 19 4	424 16 1
		£115,624 3 1

ASSETS.

	£ s. d.	£ s. d.	£ s. d.
Pedigree Stock Loans.			
Total advances made to Farmers		49,258 12 1	
Less instalments paid	17,317 1 9		
Less Deposits applied in reduction of loans.	12,959 19 4	30,277 1 1	18,981 11 0
Farm Development Loans.			,,,
Total Advances made to Farmers		82,664 0 7	
Less repayments		56,711 18 6	25,952 2 1
Empire Settlers' Loans.			
Total Advances made to Farmers		11,949 18 7	
Less repayments		3,078 13 9	8,871 4 10
Necessitous Tobacco Growers' Loans.			
Total Advances made to Farmers		3,685 5 9	
Less repayments		1,411 13 10	2,273 11 11
Irrigation Loans.			
Total Advances made to Farmers			1,104 17 2
Cotton Ginneries Loans.			
Total Advances made to Ginneries		36,913 4 1	
Stores on hand		1,385 2 6	38,298 6 7
Balance—Cash at Bank			20,142 9 6
			£115,624 3 1

INTEREST ACCOUNT.

PAID.

	£ s. d.	£ s. d.
Interest paid on Stock Loans	2,393 10 5	
,, ,, ,, Development Loans	3,648 4 10	
,, ,, ,, Empire Settlers' Loans	209 10 0	
,, ,, ,, Tobacco Growers' Loans	56 12 9	
,, ,, ,, Bank Balances	369 17 5	6,677 15 5
Balance—Interest accrued but not paid on—		
Stock Loans	715 0 6	
Development Loans	1,473 8 11	
Empire Settler's Loans	246 1 11	
Tobacco Growers' Loans	93 0 11	
Loans to Cotton Ginneries	2,627 12 6	5,155 4 9
		£11,833 0 2

ACCRUED.

	£ s. d.
On Stock Loans	3,108 10 11
Development Loans	5,121 13 9
Empire Settlers' Loans	455 11 11
Tobacco Growers' Loans	149 13 8
Loans to Cotton Ginneries	2,627 12 6
Bank Balances	369 17 5
	£11,833 0 2

T. J. NEEDHAM, Accountant, Agriculture and Veterinary Departments.

LOANS TO FARMERS FOR THE PURCHASE OF STOCK.

TABLE A.

Number, Sex and Breed of Animals Purchased from August 1925, to 31st December, 1929.

	1st August, 1925, to 31st March, 1927.		1st April, 1927, to 31st March, 1928.		1st April, 1928, to 31st March, 1929.		1st April, 1929, to 31st December, 1929.		Total.	
	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.
BULLS.										
Friesland	35	1,729 1 6	21	1,246 3 9	16	576 2 4	11	486 6 6	83	4,037 14 1
Ayrshire	7	334 7 10	4	225 16 6			2	80 0 0	13	640 4 4
Red Poll	2	141 15 0	6	292 14 11	9	442 4 0	4	267 12 9	21	1,144 6 8
Jersey			1	52 10 0					1	52 10 0
Aberdeen Angus	3	58 10 0	1	50 0 0	2	95 0 0	3	112 0 0	9	315 10 0
Devon	12	516 15 6	1	50 0 0	2	76 11 6			15	643 7 0
Shorthorn	27	1,187 2 10	7	320 19 6	11	626 10 0	9	585 17 6	54	2,720 9 10
Hereford	5	280 0 0	1	45 0 0	4	197 1 6	15	193 0 0	25	715 1 6
Sussex	1	50 0 0			7	311 13 0			8	361 18 0
Lincoln	3	196 15 0					3	205 3 3	6	401 18 3
	95	£4,494 7 8	42	£2,283 4 8	51	£2,325 7 4	47	£1,930 0 0	235	£11,032 19 8
COWS.										
Friesland	552	8,623 16 11	251	4,452 10 10	353	6,152 13 10	260	4,985 1 6	1,416	24,214 3 1
Ayrshire	107	1,080 0 0	25	386 0 0	16	182 0 0	5	70 0 0	153	1,718 0 0
Red Poll	21	340 12 11	25	176 10 0	34	278 18 8	23	269 18 6	103	1,066 0 1
Jersey							1	25 0 0	1	25 0 0
Aberdeen Angus			32	198 2 9					32	198 2 9
Devon	14	171 0 0	37	250 0 0	10	130 4 9	8	102 3 6	69	653 8 3
Shorthorn	146	1,712 19 3	141	877 2 0	73	990 18 7	92	834 15 0	452	4,415 14 10
Hereford	11	250 0 0			10	70 0 0			21	320 0 0
Lincoln	17	351 10 6					1	5 0 0	18	356 10 6
Grade	108	792 18 3							108	792 18 3
	976	£13,322 17 10	511	£6,340 5 7	496	£7,804 15 10	390	£6,291 18 6	2,373	£33,759 17 9
POULTRY						97 16 6		68 10 0		166 6 6
SHEEP	515	562 11 7	777	965 5 0	982	1,096 4 4	358	498 3 0	2,632	3,122 3 11
PIGS	28	166 8 1	17	92 12 8	25	140 10 0	3	17 0 0	73	416 10 9
DONKEYS	15	60 0 0							15	60 0 0

LOANS TO FARMERS FOR THE PURCHASE OF STOCK.

TABLE B.

Statement Shewing the Numbers, Values and Kinds of Animals Purchased under the Government Loan Scheme from 1st August, 1925, to 31st December, 1929.

	1st August, 1925, to 31st March, 1927.		1st April, 1927, to 31st March, 1928.		1st April, 1928, to 31st March, 1929.		1st April, 1929, to 31st December, 1929.		Total.	
	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.	No.	Amount £ s. d.
BULLS.										
Dairy Type	47	2,334 10 4	32	1,817 5 2	25	1,018 6 4	23	1,029 2 6	127	6,199 4 4
Beef Type	48	2,159 17 4	10	465 19 6	26	1,307 1 0	24	900 17 6	108	4,833 15 4
COWS.										
Dairy Type	697	10,751 18 7	301	5,015 0 10	403	6,613 12 6	290	5,355 0 0	1,691	27,735 11 11
Beef Type	279	2,570 19 3	210	1,325 4 9	93	1,191 3 4	100	936 18 6	682	6,024 5 10
SHEEP	515	562 11 7	777	965 5 0	982	1,096 4 4	358	498 3 0	2,632	3,122 3 11
PIGS	28	166 8 1	17	92 12 8	25	140 10 0	3	17 0 0	73	416 10 9
DONKEYS	15	60 0 0							15	60 0 0
POULTRY						97 16 6		68 10 0		166 6 6
		£18,606 5 2		£9,681 7 11		£11,464 14 0		£8,805 11 6		£48,557 18 7

LEGISLATION.

The following new agricultural legislation was introduced during 1929:—

" Animals Diseases Consolidation Ordinance, Amendment Act, 1929."—Permitting the Governor-in-Council to frame regulations to prescribe and regulate the reporting of deaths of all cattle within either the whole or any defined area in Southern Rhodesia.

" Stock and Produce Theft Repression Ordinance, 1907, Amendment Act, 1929."—This Act prescribes that every butcher and every buyer of skins and hides shall keep a register and submit returns of hides and skins of stock slaughtered or hides and skins purchased by him.

" Tsetse Fly Act, 1929."—Gives powers to provide for regulating traffic to and from areas infested with tsetse fly.

" Stock and Produce Dealer's Licensing Act, 1929."—Regulates the dealing in stock and produce belonging to natives and lays down the licences necessary.

" Land Tax Amendment Act, 1929."—Enables the Minister to exempt from taxation indigenous forest land under certain conditions.

" Chilled and Frozen Meats Export Act, 1924, Amendment Act, 1929."—This Act confirmed an agreement entered into between the Government and the Rhodesian Export and Cold Storage Company, and authorised the payment of a bounty on dressed beef exported overseas.

" Game and Fish Preservation Act, 1929."—Consolidated and amended the law for the preservation of game and fish and the protection of certain of the fauna of Southern Rhodesia.

CHAS. K. BRAIN,
Acting Secretary,
Department of Agriculture.

LIST OF ANNEXURES.

" A "—Statistical Returns, 1919 to 1928.

Reports of:—

" B "—Irrigation Engineer.

" C "—Chief Agriculturist.

" D "—Chief Entomologist.

" E "—Cotton Specialist.

" F "—Chief Chemist.

" G "—Dairy Officer.

" H "—Poultry Officer.

" I "—Chief Tobacco Adviser.

" J "—Forest Officer.

" K "—Plant Pathologist.

" L "—Stock Adviser.

" M "—Editor, " Rhodesia Agricultural Journal."

Annexure " A."

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
Cattle—										
Number of European	678,508	772,891	905,040	936,251	993,608	1,003,629	1,006,086	991,216	954,835	905,383
Number of Native	652,776	744,402	845,498	864,894	927,343	1,005,277	1,095,841	1,197,466	1,370,567	1,420,913
Total	1,331,284	1,517,293	1,750,538	1,801,145	1,920,951	2,008,906	2,101,927	2,188,682	2,325,402	2,326,296
Total acreage under cultivation as summer crops	211,034	237,268	228,000	266,607	286,837	334,604	355,481	346,776	388,724	397,455
Maize (European)—										
Acreage	173,467	186,246	181,729	220,937	231,638	232,947	239,662	267,354	295,290	314,563
Yield (bags)	1,120,548	1,220,768	662,636	1,505,580	1,080,084	1,041,904	1,393,654	1,659,597	1,227,136	1,786,411
Tobacco—										
Acreage	7,504	9,531	10,174	9,054	8,003	8,441	13,915	30,164	47,722	17,127
Yield (lbs.)	2,947,627	3,746,982	3,182,359	2,810,781	3,878,460	2,405,940	5,659,809	19,264,532	24,889,244	6,736,433
Butter (lbs.)—										
Farm	294,784	244,761	255,104	292,964	338,343	425,018	393,539	382,443	369,211	325,266
Creameries	—	—	—	282,850	554,206	871,714	1,002,850	1,168,847	1,342,348	1,002,244
Total	—	—	—	575,814	892,549	1,296,732	1,396,389	1,551,290	1,711,559	1,327,510
Exports—										
Maize and Mealie Meal (bags)	338,144	513,640	365,139	72,120	790,810	407,585	419,407	486,350	368,027	647,693
Tobacco (lbs.)	829,608	1,737,473	2,383,284	2,248,375	3,973,832	5,018,774	2,435,507	4,287,833	15,756,802	14,545,181
Cattle	27,735	37,285	12,408	23,938	34,841	50,770	60,543	74,821	46,898	71,429
Butter (lbs.)	125,225	204,678	421,815	277,700	342,759	539,825	560,688	775,023	785,741	617,328

In connection with the above figures, it should be noted that while cattle, butter and exports are for the calendar year ended 31st December of the year shown, the acerage under summer crops, as also the figures for maize and tobacco, are for the season in which planting was commenced in the year under which the figures are shown, but the crop was not reaped until the following year. Exports, therefore, should be taken as relating to the crop reaped during the year previous to that under which the exports appear.

Annexure " B."

ANNUAL REPORT OF THE IRRIGATION BRANCH

For the Year Ended 31st December, 1929.

During the year under review, Reconnaissance Survey work was initiated in Matabeleland in order to locate economical sites for water conservation works.

A Loan Fund of £10,000 was provided for the purpose of making advances to farmers for the construction of irrigation and water conservation works and the facilities provided by this Fund were later extended to cover water boring operations. In order to deal with the special problems of water conservation in Matabeleland, a branch office was opened in Bulawayo in June and this new departure has been amply justified by results as there has been a great demand for the services of the officer detailed for this work.

In other directions, also, there has been a steady expansion in the work performed, the activities of the branch being as usual of a very varied nature comprising such matters as irrigation, water supply installations, water boring, soil erosion and general engineering connected with agriculture.

The Summary below gives the approximate expenditure controlled and administered by this branch, together with estimates of further expenditure dealt with during the twelve months, exclusive of ordinary advisory work :—

SUMMARY.

	£	s.	d.
General Boring Operations	12,370	0	0
Purchase of Boring Equipment	1,150	0	0
Development and Installation of Water Supplies in Native Reserves	8,300	0	0
Boring in Native Purchased Areas	1,000	0	0
Installation Water Supplies—Government Institutions and Townships	7,045	0	0
Engineering Works for Agricultural Dept.	2,470	0	0
Surveys and Estimates for Water Supplies—Government Institutions	4,000	0	0
Estimate, Bindura Township Water and Light Scheme	7,000	0	0
Water Supplies, Victoria Limpopo Stock Route	750	0	0
Surveys and Estimates for Works for Agricultural Department	3,300	0	0
Advances from Irrigation Loan Funds Approved and Schemes Pending	4,000	0	0
Hydrography and Meteorology	950	0	0
Irrigation Reconnaissance Survey	1,100	0	0
Total	£52,435	0	0

In the above Schedule no estimate is included for cost of works surveyed by the Reconnaissance Party as these are still under investigation.

General.—The information sought by farmers this year has as usual been of a diverse nature relating to such subjects as the construction of general farm buildings. Dipping tanks, well sinking, water supplies, agricultural machinery and labour saving devices, in addition to surveys and reports on irrigation, water power schemes, and soil erosion.

The following Summary shews the number of visits paid to farmers in connection with advice of this nature, together with the total of new land reported on as irrigable :—

Number of farms visited	311
Acreage of new irrigable land investigated	1,803
Total acreage of irrigable land investigated to the end of 1929	51,281

In addition to the above, five Farmers' Association Meetings were attended and addresses delivered on Soil Erosion and Irrigation Schemes. Three lectures on Soil Erosion and Building Construction were delivered to the apprentices at the Tobacco Experiment Station.

Plans and estimates were prepared for the construction of new farm buildings at Gwebi and Matopos Experimental Farms and at the Poultry Experiment Station, Salisbury. The installation of a power plant at Inyanga Estate and an electric light plant at the Enkeldoorn School Hostel was also supervised by this Branch.

Surveys and estimates were prepared in connection with 25 water supply schemes for small townships and Government Institutions, and of this number 15 reached construction stage this year, the remainder being held over until the necessary funds are available. A water supply scheme from the Limpopo River for the new Beitbridge Township was the most important of these works undertaken this year.

The number of farms visited this year is 311, an increase of 110 over the number visited in 1928. This large increase is mainly due to opening up a new field by the appointment of an Engineer for Matabeleland as there has been a great demand for his services and he has dealt with 62 applications since the office was opened in June. In addition, there is an increasing demand for the services of an Engineer for advising on and setting out soil erosion protection works.

With regard to the work in the Matabeleland Circle, the Irrigation Engineer in charge of that work reports as follows:—

> " The number of applications for advice dealt with, and the number of farmers interviewed has proved the justification for the existence of this office.
>
> " A great deal of interest in irrigation and water conservation has been displayed not only by the farming community, but also by a number of commercial men in this part of the country.
>
> " The subject of soil erosion has also attracted attention.
>
> " Up to the present, however, a great deal of the interest in these matters has been of a general nature, and there is no doubt that more propaganda work will be necessary in the future."

Irrigation Reconnaissance Survey.—In April a commencement was made with Irrigation Reconnaissance survey work in Matabeleland, but the party was not at full strength until June. The Tegwani River system was first investigated over a length of 35 miles from the easterly beacon of the Tegwani Wesleyan Mission farm to the northerly beacon of " Braemore " farm,

The main river itself proved disappointing for irrigation schemes owing to the flat grade of the river and the lack of suitable soil. Numerous weir sites suitable for storage of water for stock, however, were located. The tributary streams were also investigated with more satisfactory results as two suitable storage dam sites were located and surveyed which would command irrigable land on " Excess " and " Retreat " farms.

The Bembezaan River was next surveyed for a distance of twenty miles above its junction with the Sebakwe River in the neighbourhood of " East Clare " Estate. Four suitable storage sites were located capable of irrigating about 146 acres of alluvial soil, adjacent to the river by means of pumping. It is possible that this scheme may be proceeded with in the near future.

A detailed survey was then carried out of a storage site in the Umshandige Gorge in the Victoria District which is capable of irrigating a considerable area of Crown land situated in the Inyanda Block.

The survey party returned to the Bulawayo Office early in December and are at present engaged in plotting the surveys and preparing preliminary estimates of the cost of the schemes investigated.

A separate Report on the operations of the Survey Party will be submitted later when the full information is available.

Irrigation Loan Funds.—A sum of £10,000 was made available in the current year's estimates for the purpose of advancing loans to farmers for the construction of irrigation works.

Regulations governing these loans were published in Government Notice No. 347 of the 7th June last, and authority for their extended use to cover the cost of sinking boreholes was provided under the new Boring Regulations published in Government Notice No. 546 of the 20th September, 1929.

It was not considered that there would be any great demand in the first year of operation as the investigation of schemes, in respect of which loans would be applied for, would take some time. Actually, 20 applications for irrigation loans have been received to date, of which 13 have been sanctioned; three are waiting sanction and four have been refused. Of the 20 applications received, 11 have been for repayment on boring charges; 7 for loans for construction of irrigation works, and 2 for soil erosion protection works. The loans sanctioned amount to a total of £2,000 and the requests for loans still awaiting sanction total a further £2,000. This total of £4,000 is distributed as follows among the various types of works covered by the loans:—

(a)	Irrigation Works—£2,450 for 6 schemes totalling	170 acres.
(b)	Repayment of Boring Charges—£1,450 for 9 farms with	17 boreholes
(c)	Soil Erosion Protection Works— £100 on 1 farm.	
	Total	£4,000

Practically the whole of these advances are covered by hypothecation on the title deeds of the farms concerned and carry interest at 6%—the period for the redemption of the loans varying between five and ten years.

It is anticipated that there will be a bigger demand for these loans during the coming year when the facilities available become more generally realised.

Irrigation.—The number of new irrigation schemes advised on favourably during this year have totalled 58, with a total irrigable area of 1,083 acres, the average irrigable area per scheme being, therefore, approximately 19 acres only. The larger schemes investigated by the Reconnaissance Survey Party have not been included in this total as they will be reported on later.

The small extent of the average scheme is not a disadvantage, but rather the reverse, as these small areas are capable of being fully worked and developed by an individual. They are, therefore, more likely to produce a profitable return on the capital outlay expended than larger schemes which are beyond the capacity of one individual to fully develop.

There is an increasing tendency for schemes advised on to be constructed at an early date, as the necessity for irrigated crops, when mixed farming is practised, is becoming realised. Formerly, this was not the case and advice was frequently sought as to the irrigation possibilities on a farm with the idea of advertising this as a potential asset in an attempt to dispose of the farm without the scheme being developed in any way.

With regard to the market for irrigated crops, if not utilised for dairying or for the fattening of stock, it is of interest to note in the Government Statistician's report for 1928 that the imports of irrigable crops which could be grown in the Colony, amount to £142,000, whereas the total value of the irrigable crops grown in the Colony amounted to £120,000 which included an amount of £87,000 for citrus.

The official returns of land under irrigation from grants issued under the Water Ordinance shew that during 1929 an area of 7,272 acres was irrigated as compared with 6,020 acres in 1928, i.e., an increase of approximately 20 per cent., which is an encouraging feature.

With regard to conditions in Matabeleland, the engineer in charge of that circle reports as follows:—

> "A number of farmers have realised the absolute necessity for having assured supplies of water for stock and for the provision of green feed during the winter months, and are carrying out the work necessary, but unfortunately the majority at the present time, display considerable apathy in these matters.

"Several large Companies have been given advice on the provision of water supplies and conservation of water and are carrying out the recommendations made to effect the desired results.

"The construction of numerous weirs on rivers with a view to increasing stream flow is very necessary.

"This is a difficult matter for the farmer himself to deal with, owing to the expense involved and the fact that there is no direct return from the money expended.

"I am of the opinion that money should be spent by the Government on this connection, and am convinced that the result of such expenditure would prove of inestimable value to the country."

Soil Erosion.—Requests for advice on this subject continue to increase rapidly, and the farmers who are taking active steps to check this menace are more generally distributed over the whole country than formerly.

It is difficult to adequately cope with the demands for this type of advice as the services of an engineer are usually required in the months of September and October when the lands are ploughed and cleared prior to planting.

If the work were more evenly distributed over the whole year, a greater volume could be more satisfactorily dealt with. The number of visits to farms on soil erosion matters totalled 124 this year as compared with 53 last year; this large increase being a striking commentary on the interest now being taken in this matter. It may be definitely stated that almost invariably the necessary protection works are put in hand after the visit of an engineer.

Boring in Native Reserves, Crown Lands, Farms, Etc.—No increase was made to the number of drilling machines in operation during the previous year and the full strength remained at a total of thirteen machines engaged in boring work in the Colony.

All the drills, however, were not fully occupied throughout the year—owing to the heavy rains last season Drill No. 3 was out of commission until the beginning of May; Drill No. 4 was brought into Salisbury for refitting and was not put into the field until September. Drill No. 5 was laid off for two months owing to the necessity for replacing a defective boiler and the Mining Drill No. 12 has not been in operation for the last two months. There were also short periods of delays on some of the other drills. Making allowances for these non-working periods, the strength was equivalent to 11 5-12 drills working for a complete year. The summary of footage drilled, cost per foot and aggregate yield per 24 hours of water supplies developed is as under:—

Total depth drilled	17,641 feet
Footage drilled per working month per drill ...	128.8 ,,
Number of boreholes sunk	138 ,,
Average depth per borehole	127.8 ,,
Average charge, including casing (all boreholes)	2 3/5 per ft.
Aggregate yield of successful boreholes	1,585,780 gallons per 24 hours.
Percentage of boreholes sunk yielding supplies of over 2,000 gallons per day	68.1 %

In the following Summary is shewn the cost of drilling for private applicants, on Crown Lands, in Native Reserves, etc:—

In the case of private applicants, transport, labour and fuel is supplied by the applicant; but in the other cases, these are supplied by the Government, and the cost of these services included in the Boring Costs.

	Private Applicants.	Government Institutions.	Townships.	Crown Lands.	Native Reserves.	Native Purchase Areas.	Mining Prospecting.
Total depth drilled	3,836′	1,583′	748′	4,635′	5,158′	1,292′	389′
No. of drills months	26.5′	16.5′	7.5′	42′	31.5′	8.0′	5.0′
Ftge. drilled per working month per drill	144.7′	96.0′	99.7′	110.4′	163.7′	161.5′	77.8′
No. of boreholes sunk	35	12	7	37	35	10	2
Avge. depth per b'hole	109.6′	131.9′	106.9′	125.3′	147.4′	129.2′	194.5′
Avge. cost per foot (including casing	17/3	37/4	26/9	26/2	21/5	19/8	26/6
% of successful b'holes	74.3	75.0	85 7	65	68.6	20	—

The percentage of successes is practically the same as those obtained in previous years and can be considered as very satisfactory when the difficult nature of the geological formations encountered in this Colony is borne in mind.

The only unsatisfactory area is the Native Purchase Area in the southern portion of Gwanda district where only two successful supplies have been developed in the ten boreholes sunk.

It is intended to put down a trial borehole about 250 feet deep in this area to determine whether supplies are available at depth. The average cost per feet of all boreholes including those in Native Reserves sunk in 1928 was 26s. 11d., and it will be noted that the cost this year is 3s. 6d. less. This cheapening in cost is mainly due to the facts that costs for boring in Native Reserves have been reduced from 27s. 2d. to 21s. 5d, owing to the easier nature of the formations drilled through this year, and that the average charges to private applicants have been reduced from 21s. 2d. to 17s. 3d. per foot. This lessening in cost to private applicants is very satisfactory and is partly due to the easy formations encountered in the Bubi and Nyamandhlovu districts where a number of boreholes in private farms have been put down and owing to drills being readily available in the various districts and able to carry out private applications with the minimum amount of extra expense for railage and transport charges.

It is of interest to note that during the last five years 15,100 feet have been drilled for private applicants at an average cost of 18s. 10d. per foot. This low cost compares more than favourably with the cost of well sinking when it is considered that the cost of casing is included, and that boreholes are put down to depth in all formations and much larger and more permanent supplies of water developed than is usually the case in wells.

Below are given the details of the work performed by each drill :—

Drills Nos. 1, 2, and 3.—These Drills were operating in the Mphoengs, Semokwe, Shashani, Gwaai and Shangani Reserves during the year. Details of the footage drilled, cost, etc., are given in the appropriate schedules attached to this report and fuller details of these operations are obtainable from the appendix to the Annual Report of the Chief Native Commissioner.

Drill No. 2 sank one borehole in a private farm in the neighbourhood of Gwaai Siding and achieved a record in that 106 feet were drilled in one day; the cost being only 9s. 7d. per foot including casing which had to be put down for the full depth of the hole.

Drill No. 4.—This plant was withdrawn from the field in January and brought into Salisbury for refitting. It was put into the field again in September and has been engaged on drilling for private applicants in Matabeleland. Nine boreholes have been sunk and eight successful supplies developed—899 feet have been drilled

at an average cost of 12s. 10d. per foot. This is a very low cost of drilling when it is considred that most of the holes had to be lined to considerable depth. Owing to the short period of running, the drill however has not earned sufficient revenue this year to cover depreciation in full.

Drill No. 5.—This drill has been operating in Charter, Chilimanzi and Gwelo districts throughout the year, and transport charges have been heavy as there were isolated jobs in different localities. The machine, however, is engaged on a programme of work in a defined area on Crown Land farms in the Lower Gwelo district. In all, two boreholes were sunk for Government Institutions; three for Que Que Township; one in a mining prospecting area to the west of Que Que and five on Crown Land farms. The drill was held up for two months owing to a defective boiler so that the results are very satisfactory when this lost time is taken into account.

Out of the 11 boreholes, ten were successful; total footage drilled 1,218 feet at an average cost of 27s. 6d. Owing to the loss of time in transport, etc., the drill has not earned sufficient to cover full cost of depreciation.

Drill No. 6.—This Drill has operated in Lomagundi district throughout the year. Three boreholes have been sunk for private applicants, one at a Government Institution, and six on Crown Lands. Out of the 10 boreholes sunk, 8 were successful; total footage drilled 1,622 feet at an average cost of 22s. 10d. per foot—private applicants cost 15s. 10d. per foot.

Some of the boreholes on Crown Lands were in difficult drilling formation as hard glassy quartz reefs dipping at high angles intersect the much softer schists.

Drill No. 7.—This drill was engaged at the commencement of the year in the Bubi district completing work there for private applicants and was then moved to Crown Land farms in the Turkois Mine Area—Hartley district. This drill was delayed during the move owing to heavy rains and was later held up owing to the Railway Strike—the loss of revenue owing to these delays has not enabled full depreciation to be allowed. One borehole was sunk for a private applicant; one at a Government Institution and nine on Crown Land farms. Out of 11 boreholes sunk, 10 were successful; total footage drilled 1,193 feet at an average cost of 25s. per foot; cost to private applicant 13s. 9d. per foot.

Drill No. 8.—This drill has been mainly engaged on drilling for private applicants in Salisbury and Marandellas districts. Ten boreholes have been sunk for private applicants and two for Government Institutions. Out of the 12 boreholes sunk, only 7 were successful—this low percentage of successes being mainly due to the fact that a number of boreholes were sunk on small plots in the neighbourhood of Salisbury, where there is little latitude for the selection of suitable boring sites. Total footage drilled—1,458 feet at an average cost of 20s. 3d. per foot—cost to private applicants 19s. 10d. per foot.

Drill No. 9.—This drill was mainly occupied in drilling for private applicants in Mazoe, Salisbury and Hartley districts, but has recenty shifted to Crown Lands farms in the Darwin area. Eleven boreholes have been sunk for private applicants —two for Government Institutions and one on Crown Land farms. Out of the 14 boreholes sunk, 10 were successful—total footage drilled 1,326 feet at an average cost of 24s. 7d. per foot—cost to private applicants 20s. 10d. per foot. The average cost of drilling in this case is somewhat high owing to the machine having had two expensive moves from Salisbury to Shamva and then to the Darwin area.

Drill No. 10.—This drill was wholly occupied in drilling on Crown Land farms in the Western Umvukwes area of Lomagundi district. The results have been very disappointing, as out of eight boreholes sunk only three have yielded useful supplies—fortunately the failures have all been on unoccupied farms which are, therefore, useless for settlement. Total footage drilled 1,249 feet at an average cost of 25s. 4d. per foot.

Drill No. 11.—This drill has been engaged on Gwanda district throughout the year—one borehole was sunk on Crown lands, one at a Government Institution and ten in the Native Purchase Area in Southern Gwanda. Out of the 12 boreholes sunk, only three have yielded useful supplies—this disappointing result is due to the failure to obtain water supplies in the Native Purchase area. A trial borehole is now being sunk to depth, and if this is unsuccessful the area will be abandoned.

Total footage drilled 1,521 feet at an average cost of 25s. 3d. per foot.

Drill No. 12.—This drill was purchased by the Mines Department for prospecting work. As there was no work offering at the commencement of the year, it was utilised for deepening existing boreholes for the Gatooma Municipality. It was then moved 60 miles west of Que Que to prospect the Emperor Base Metal Claims for copper-inclined holes at an angle of 65° being sunk, owing to the broken nature of the formation the angle was not maintained and the holes were finally abandoned. The drill has been stored in Salisbury for the past two months as there is no work offering for it at present.

Total footage drilled 721 feet at an average cost of 32s. 6d. per feet.

Drill No. 13.—This drill has been mainly occupied in boring on Crown Land farms in the Victoria district throughout the year, seven boreholes having been sunk on Crown Lands and two for Government Institutions.

Out of the nine boreholes sunk, six have yielded useful supplies—total footage drilled 1,019 feet at an average cost of 32s. 5d. per foot.

This average cost is high owing to the expensive drilling at Chibi Camp in hard granite and to the fact that the drill was held up for six weeks owing to lack of labour. The staff of the Boring Section during the past twelve months consisted of the Boring Superintendent, Boring Inspector, 12 Drill Foremen, 2 Assistant Drill Foremen and one Drill Learner. The Boring Inspector was absent on six weeks' leave during the year and his duties were carried out by the Boring Inspector who in turn was relieved by the Senior Drill Foreman.

The staff and drill personnel have carried out their duties in an efficient and conscientious manner and their good work is reflected in the Boring Costs.

Water Supplies: Native Reserves.—In addition to the water boring operations in the Native Reserves, windmills, tanks and troughs have been installed at a number of the permanent supplies developed in the various Reserves.

Sixteen complete installations have been erected at an average cost of £220 apiece, and the equipment for fourteen further installations has been purchased and erection will be completed at the end of the rainy season. A new type of hand-pumping attachment, which may be operated without disconnecting from the windmill, has been tried out on the Gwaai Reserve and has been reported as satisfactory. Twelve of this type of attachment have been purchased and are awaiting erection. Further details of the work performed are dealt with in the Chief Native Commissioner's Annual Report.

Water Supply Installations for Government Institutions.—During the year a number of water supply schemes for Government Institutions and Townships were investigated and reported on. Estimates were prepared and the construction supervised of such schemes as were proceeded with, an amount of about £7,045 having been expended to date. Works have been carried out and supervised at Chibi, Sinoia School, Sinoia Hospital, Chakari Police Camp, Plumtree School, Gwanda, Bikita, Salisbury Forest Nursery, Enkeldoorn Hospital, Enkeldoorn School, Salisbury Police Camp, Salisbury Hospital, Shamva and Marandellas. A water supply scheme and complete reticulation system for the new Beitbridge Township is nearing completion; the cost of this work being about £3,500. Reports and estimates were also prepared for water supply installations at Banket, Gwanda, Rusape, Hartley, Veterinary Laboratory, Salisbury, Gomohuru Leper Settlement, Gutu, Mtoko, Shabani, and Gokwe. The estimated cost of the necessary works being £4,000.

A report was written in connection with the raising of a loan for Bindura Town Management Board. This scheme had been previously investigated by this Branch and detailed estimates and specifications prepared; the estimated total expenditure being £7,000.

Meteorology.—The work of the Meteorological and Hydrographic officers is supervised by the Assistant Hydrographic Engineer. The routine work consists of the classification of data obtained from local observers relating to the rainfall and climatic conditions in the Colony.

The change in the number of reporting stations was as under during the year:

	Number: 31/12/18.		Number: 31/12/29
Stations with Automatic Instruments	3	.....	3
Barometric Stations	9	.....	11
Thermometric Stations	45	.....	47
Rainfall Stations	504	.....	550
	561	.....	611

The data obtained are checked and tabulated in a convenient form for general information and scientific purposes. The regular information published during the year consists of the following:—

(a) Annual Meteorological Report.

(b) Monthly Weather Report in the Agricultural Journal.

(c) A Weekly Summary of Rainfall.

(d) A Daily Weather Report and Forecast is issued during the rainy season and telegraphed to all official telegraph offices.

(e) Daily records from five barometric stations are forwarded monthly to the Meteorological Office, London.

(f) A summary of our mean seasonal rainfall and deviation from normal is sent to the Indian Meteorological Office in April. This information is used to forecast the Indian Monsoon Rainfall.

(g) A cablegram is now despatched to Rio de Janeiro giving Bulawayo rainfall—July to November, and is used for forecasting rainfall in Ceara.

Special weather reports, forecasts and upper air data were supplied to Aviators during the latter part of the year.

Seasonal Forecast.—We were fortunate in obtaining the services of Sir Gilbert Walker, late Director-General of Observatories, India, for a few days during the year. In anticipation of his visit, various correlation coefficients were worked out resulting in the following factors of significance:—

Falklands Islands temperature, Aug.-Oct. previous ...	plus 0.52
Bulawayo pressure fluctuations, April-May previous...	plus 0.52
Mauritius temperature, Sept.-Nov. previous	minus 0.51
Rio Janeiro pressure, Aug.-Oct. previous	plus 0.61

The equation at present in use after six years has shewn a considerable fall off in accuracy. Equations utilising the above factors shew a high correlation and Sir Gilbert Walker recommended that an Equation available on the 2nd December should be put into use. He considered that with this equation forecasts could be made in five years out of ten with a probability of success of 4 to 1.

Daily Forecast.—The plotting of isobar maps at 1,500 metres above sea level has proved satisfactory and will be continued. Certain investigations were undertaken early in the year on the lines of work done by the Bergen School with mixed results. The occurrence of " fronts " was investigated and it was found that " cold fronts " occurred, but warm fronts were not discovered. The effect of humidity was investigated in terms of vapour pressure and a very useful criterion for rain established.

The Irrigation Engineer has recently undertaken the extension of his original classification of pressure maps and the results when completed will be of great value.

Aviation Meteorology.—From time to time weather reports have been supplied for flights. The necessity for a meteorological service has so far been somewhat masked by the majority of flights taking place in the dry season. Recent experience has shewn the necessity for the rapid collection of weather messages, particularly from Northern Rhodesia, if flying is to be undertaken during the rains.

The recent visit of the Survey Party for the Cape to Cairo Air Service has enabled us to determine the service necessary for regular flights. It will be necessary for this office to supply

(1) Regular forecasts of weather from Pietersburg, Transvaal, to (probably) Mbeya, Tanganyika;

(2) weather messages from the stations along the routes to aerodromes and aeroplanes in flight; and

(3) upper air data, wind velocities, cloud heights, etc.

This will involve a considerable amount of extra work, and the special training of observers along the routes traversed.

Upper Air Data.—The use of pilot balloons has been continued and from July a regular routine of two balloons per day has been established. It is hoped to introduce a similar service at Bulawayo during this year. Messrs. Wynne Eaton and Preston kindly offered to take up the Assistant Hydrographic Engineer with instruments. The offer was accepted and a flight to 7,000 feet was carried out. The information gained proved illuminating and I am satisfied that valuable information for scientific and forecasting purposes could be obtained by this method.

Hydrographic.—The routine work of this section comprises the collection of data relating to the storm and winter flow conditions of the chief rivers in the Colony.

The data is studied in conjunction with the rainfall and physical conditions of the catchments with a view to supplying reliable information regarding the potentialities of the different river systems for irrigation and power purposes. The value of extensive records of this nature will be fully proved in the future.

The information is obtained by means of

(a) Automatic recording instruments at gauging weirs and dams;

(b) daily records of river level by local observers;

(c) individual gaugings by members of the engineering staff while on tour.

There are 12 gauging stations of the first class in existence.

Water Ordinance.—The writer sat as Engineering Assessor on four Water Courts during the year; one of which was a special court to deal with the Railways use of water on the Victoria Falls, Bulawayo, Salisbury Sections.

The remaining courts were for ordinary irrigation and mining applications. In all 58 applications were dealt with, of which 21 were for railway purposes, 10 for mining purposes and the remainder for irrigation.

Authority was sought to irrigate a total of 1,023 acres, of which grants were authorised for irrigation of 418 acres.

Staff.—An increase of staff was necessitated during the year owing to the opening of a branch in Bulawayo, and the commencement of Reconnaissance work.

The staff was practically at full strength throughout the year, with the exception of the Boring Superintendent and the writer, who were absent on long leave.

Acknowledgment is made of the loyal services rendered by the whole staff of this branch during the year.

C. L. ROBERTSON,
Irrigation Engineer.

SCHEDULE NO. 1.—STATEMENT SHEWING CAPITAL VALUE OF DRILLING PLANTS OPERATING UNDER REVENUE VOTE, AND AMOUNTS EARNED TO COVER DEPRECIATION ON TOOLS AND PLANT.

Drill Nos.	Period.	Running Costs.	Revenue Earned.	Capital Values.	Remarks.
		£ s. d.	£ s. d.	£ s. d.	
3	1/ 1/29 to 31/12/29	——	——	1,149 16 11	From the 1/1/29 to 31/12/29 operated under Loan Vote in Shangani Native Reserve in place of Drill No. 11 which was purchased in drill on Native Reserves but has operated under Revenue Vote.
4	1/ 9/29 to 31/12/29	704 2 3	633 10 2	1,638 8 4 440 13 7	Capital value on the 1/1/29, £1,638 8s. 4d. plus £440 13s. 7d. value of new boiler and road wheels purchased under Loan Vote during 1929.
5	1/ 1/29 to 31/12/29	1,654 16 3	1,798 6 0	2,029 6 0 244 5 10	Capital value on the 1/1/29, £2,029 6s. plus £244 5s. 10d. value of new boiler purchased under Loan Vote during 1929
6	1/ 1/29 to 31/12/29	1,717 8 3	2,065 10 4	1,678 13 10	Capital value on the 1/1/29: £1,678 13s. 10d.
7	1/ 1/29 to 31/12/29	1,610 13 10	1,595 11 11	1,586 4 0	,, ,, ,, ,, £1,586 4s. 0d.
8	1/ 1/29 to 31/12/29	1,355 19 10	1,570 14 11	2,095 13 2	,, ,, ,, ,, £2,095 13s. 2d.
9	1/ 1/29 to 31/12/29	1,516 6 7	1,787 16 6	1,905 19 11	,, ,, ,, ,, £1,905 13s. 2d.
10	1/ 1/29 to 31/12/29	1,243 10 4	1,623 5 11	2,029 8 3	,, ,, ,, ,, £2,029 8s. 9d.
11	1/ 1/29 to 31/12/29	1,670 9 8	1,967 11 0	——	Purchased for work on Native Reserves. Depreciation added to running cost of Plant No. 3 operating in the Shangani Native Reserve.
13	1/ 9/28 to 31/12/28	853 14 2	616 9 6	2,225 17 8	Purchased in 1928, cost £2,225 17s. 8d. As it only worked three months in 1928, it was not depreciated on the 1/1/29.
	1/ 1/29 to 31/12/29	1,267 9 6	1,776 1 11	——	
		£13,594 10 8	£15,434 17 2	£17,024 7 6	

SCHEDULE NO. 1.—Continued.

Drill Nos. Period.	Running Costs. £ s. d.	Revenue Earned. £ s. d.	Capital Values. £ s. d.	Remarks.
	£13,594 10 8	£15,434 17 2	£17,024 7 6	
Lorry			20 0 0	Capital Value on the 1/1/29.*
Tools			326 7 4	Spare Tools Purchased.
			£17,370 14 10	
Deduct Stores on hand with drills	285 18 8		150 0 0	Deduct Spare Tools in Store.
	£13,308 12 0	£15,434 17 2	£17,220 14 10	
Ford Express Van			230 0 0	Purchased in April, 1929, for inspection work in Matabeleland.
			£17,450 14 10	No depreciation allowed.
Ford Lorry	Deduct surplus for depreciation		2,126 5 2	*Ford Lorry depreciated on the 31/12/29 down to £20 Lorry still in use for inspection work in Matabeleland.
			£15,324 9 8	

	Allocation for Depreciation. £ s. d.	Present Value. £ s. d.	
Drill No. 3	244 16 0	905 0 11	£15,434 17 2 Revenue Earned.
Drill No. 4	85 8 0	1,593 13 11	£13,308 12 0 Running Costs.
Drill No. 5	244 16 0	2,028 15 10	
Drill No. 6	244 16 0	1,433 17 10	£2,126 5 2 Surplus for Depreciation of Drills.
Drill No. 7	244 16 0	1,341 8 0	
Drill No. 8	244 16 0	1,850 17 2	
Drill No. 9	244 16 0	1,661 3 11	
Drill No. 10	244 16 0	1,784 12 3	
Drill No. 13	327 5 2	1,898 12 6	
	£2,126 5 2	£14,898 2 4	
Ford Express Van		230 0 0	
		£15,128 2 4	
Ford Lorry		20 0 0	
		£15,148 2 4	
Value of Tools issued		176 7 4	
		£15,324 9 8	

SCHEDULE NO. 2. SCHEDULE OF BORING OPERATIONS FOR 1929 FOR DRILLS OPERATING UNDER REVENUE VOTE.

Drill Nos.	Areas.	Formations.	No. of boreholes.	Total Depth Bored in ft.	Total No. of Successful boreholes.	Total Supply in galls. per 24 hours.	Average cost per foot, including casing.	Maximum cost per foot, including casing.	Minimum cost per foot, including casing.	Remarks.
4	Bubi District	Granite	2	113	1	16,800	17/10	19/4	16/4	Boreholes drilled for private applicants who supplied transport, fuel and water.
	Bembesi Area Nyamandhlovu Dist.	Basalt, Sandstone, with beds of running sand	7	786	7	87,500	12 2	20 11	8 9	Boreholes drilled for private applicants who supplied transport, fuel and water. Working period 4 months.
5	Charter	Granite	1	90	1	28,800	74 2	74 2	74 2	For Government institutions and public supply at Enkeldoorn Village. Government supplied transport, fuel and water.
	Chilimanzi	Shale, running mud and sand	1	132	1	24,000	32/4	32/4	32/4	Mtao Forest Reserve. Government supplied transport, fuel and water.
	Gwelo	Banded iron stone, schist, granite and dolerite	3	416	3	53,760	16/6	18/8	14/5	For Que Que Municipality, who supply transport fuel and water.
	Do.	Schist and diorite	1	111	1	24,000	38/-	38/-	38/-	For public supply on Kokwe Road. Government supplied transport, fuel and water.
	Do.	Schist and quartzy reefs	5	469	4	96,000	24/6	32/3	16/10	Crown Land Farms. Government supplied transport, fuel and water. Working period 10 months.
6	Lomagundi District Sinoia Area	Granite and Schist	3	433	3	60,000	15 10	18 -	14 3	For private applicant, who supplied transport, fuel, water
	Do.	Schist and quartzy reefs	1	190	1	30,000	31/8	31/8	31/8	For Sinoia School. Government supplied transport, fuel and water.
	Do.	Schist and large bodies of quartzy	6	999	4	65,200	24/2	37/1	19/2	For Crown Lands. Government supplied transport, fuel and water.
7	Bubi District Inyati Area	Schist	1	124	1	30,000	13 9	13 9	13 9	For private applicant, who supplied transport, fuel, water.
	Hartley District Chakari Area	Schist	1	120	1	30,000	16/-	16/-	16/-	For Chakari Police Post. Government supplied transport, fuel and water.
	Do.	Schist, hard, fine-grained	9	949	8	139,200	27/9	42/2	16/3	For Crown Lands. Government supplied transport, fuel and water. Working period 11 months.
8	Salisbury	Schist, banded iron-stone	8	1065	4	48,000	20/4	26/4	10/9	Cleaning out old borehole and deepening it by 13 feet. Work included dismantling and re-erecting windmill at Government Forest Nursery. For private applicants who supplied, transport, fuel, water.
	Marandellas District	Schist, granite and dolerite	2	190	2	36,000	17/-	17/7	16/6	For private applicants who supplied, transport, fuel, water.
	Do.	Granite	2	203	1	96,000	23/1	23/9	22/7	For Government institutions at Marandellas. Government supplied transport, fuel and water. Working period 12 months.

SCHEDULE NO. 2—Continued.

Drill Nos.	Areas.	Formations.	No. of boreholes.	Total Depth Bored in ft.	Total No. of Successful boreholes.	Total Supply in galls. per 24 hours.	Average cost per foot, including casing.	Maximum cost per foot, including casing.	Minimum cost per foot, including casing.	Remarks.
9	Mazoe, Salisbury and Hartley Districts	Granite Schist and quartzite	11	968	9	101,600	20/10	59/6	12/6	For private applicants, who supplied transport, fuel and water. The borehole costing 59/6 was for deepening an old hole by 39 feet and includes erecting and dismantling a windmill.
	Mazoe	Epidiorite	2	208	1	12,000	37/6	39/10	35/7	For Government institutions and public supply at Shamva Village. Government supplied transport, fuel, water.
	Do.	Granite	1	150	—	—	30/11	30/11	30/11	For Crown Land Farm. Government supplied transport, fuel and water. Working period 12 months.
10	Lomagundi District Western Umvukwes Area	Granite	8	1249	3	21,600	25/4	33/4	15/5	For Crown Land. Government supplied transport, fuel and water. Working period 12 months.
11	Gwanda District	Schist, hard, fine-grained granite	1	144	—	—	22/11	22/11	22/11	For Crown Land. Government supplied transport, fuel and water.
	Do.	Schist, hard, fine-grained	1	185	1	7,680	52/6	52/6	52/6	For Government institutions at Gwanda Village, and public supply. Government supplied transport, fuel, water.
	Do.	Granite and dolerite	10	1292	2	12,960	19/3	27/3	16/4	For Crown Lands Native Purchase Area. Government supplied transport, fuel and water. Working period 12 months.
12	Hartley District Gatooma	Schist, hard, fine-grained	4	332	3	60,000	39/6	55/6	24/3	For Gatooma Municipality. Three old boreholes were cleaned out and deepened and one new borehole 8 inches in diameter was drilled. Cost includes time spent in cleaning out the old boreholes, and extracting old casing. Municipality supplied transport, fuel, water.
	Gwelo District	Schist, hard, fine-grained	2	389	—	—	26/6	27/-	25/7	Two prospecting holes sunk at an angle for a proving copper proposition. Working period 9 months.
13	Victoria District	Granite	2	344	1	3,640	39/4	44/1	34/6	For Government Buildings, Chibi Native Commissioner and Police. Government supplied transport, fuel, water.
	Inyanda Block	Granite and hard schist	7	675	5	57,000	29/-	66/4	15/4	For Crown Land. Government supplied transport, fuel and water. The expense of one borehole is abnormally high owing to delay of six weeks in procuring sufficient native labour from the Bureau. Working period 11 months.

Some of the Friesland Cows at the Gwebi Farm.

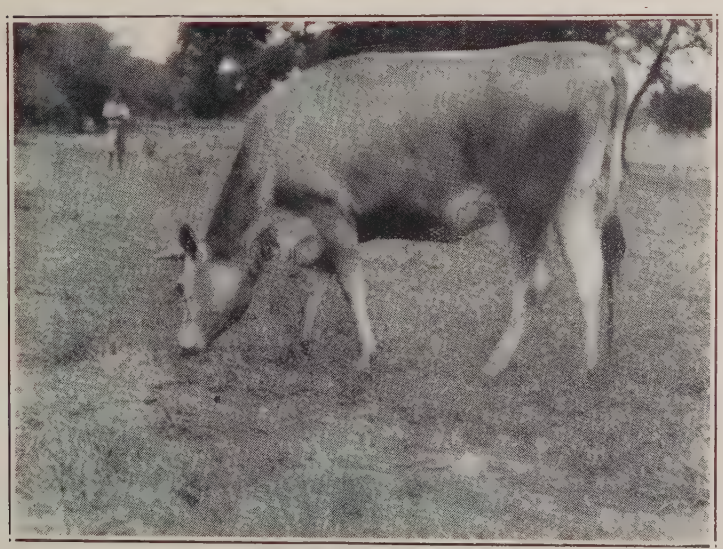
Two other views of the Friesland Cow Herd, Gwebi Farm.

Friesland Heifers under 2 years. Bred on the Gwebi Farm.

The ten Imported Pedigree Shorthorn Heifers on the Gwebi Farm.

CATTLE AT THE MATOPOS SCHOOL OF AGRICULTURE.

Jersey Bull, Cupid's Boy, Vol. 40. Calved 23rd May, 1927. In 1928 gained 2nd prize Royal Counties Show, 2nd prize Wiltshire Show, 3rd prize R.A.S.E. Show and 1st prize New Forest Show.



Jersey Heifer bred by His Majesty The King at Windsor Stud Farm.

MATOPO SCHOOL OF AGRICULTURE.

Five of the Pedigree Red Poll Heifers.

Group of the Ayrshire Heifers.

Annexure " C."

ANNUAL REPORT OF THE CHIEF AGRICULTURIST

For the Year 1929.

Season and Crops.—After a promising opening, the season over most of Mashonaland proved very disappointing, chiefly owing to the spell of cold, wet weather which prevailed from the 10th January until the 8th February. During this period an average of about 13-14 inches of rain fell throughout the principal maize producing areas, and these heavy and constant rains were accompanied by an unusual lack of sunshine—not more than about two hours of sunshine a day being recorded between the 23rd January and the 4th February.

These conditions caused most soils throughout the main arable farming areas to become cold and water-logged, with the result that crop growth was severely checked in spite of the weather for the remainder of the season being not abnormal.

Maize.—Maize growers suffered in particular, and in a number of instances are reported to have been from 20-30 per cent. down on their estimated production. On the Gwebi farm, where much of the land is intolerant of an exceptionally wet season, the average maize yield was reduced by more than 2 bags an acre as compared with the two previous years.

On the other hand it is satisfactory to record that Matabeleland as a whole enjoyed a good season and the harvest there is said to have been the best experienced for many years. The Government farm, Matopo, produced 2,106 bags of maize off 200 acres, and a number of Matabeleland growers who take maize production seriously, recorded average yields of 10 bags and more an acre.

The total maize acreage planted by European farmers is estimated to have been rather over 300,000 acres as compared with 295,290 acres in 1928. Total production is placed at about 1,800,000 bags as against the 1,268,100 bags of the previous year.

In the early part of the season it was confidently expected that the total output would exceed two million bags, and this figure would undoubtedly have been reached but for the unfavourable weather in January and February.

Unfortunately the overseas prices for maize have recently been depressed and it is feared that the average selling price will prove to be from 1/- to 1/6 a bag lower than in 1928.

The acreage planted to Ground Nuts increased from 6,882 to 9,087 acres, the latter being the largest area yet planted to this crop. The average yield per acre, however, was the lowest recorded for four years, equalling only 7 bags an acre and the total output only reaching 63,707 bags.

During the year efforts were made by the Department in conjunction with the Farmers' Co-operative Society, Salisbury, to bring about a ground nut pool for the overseas marketing of the crop, with a view to placing the growth of this product on a more satisfactory basis. The idea unfortunately failed to fructify, but the Society referred to, on behalf of its members, has continued to explore overseas outlets and has shown that there are good profits for a trade in specially graded nuts, suitable or the confectionery and street-barrow markets. Grading and sorting by hand is, however, too laborious and expensive, and unfortunately it seems difficult to secure a satisfactory mechanical grader. It is to be hoped, however, that the matter will not be dropped, for there is urgent need for opening up profitable outlets which will permit of this crop being established as a major one over large areas of Rhodesia.

Plantings of Sunflower—in part used for green manuring—also showed an increase of from 5,893 acres in 1928 to 10,466 acres in 1929, the seed yield increasing likewise from 12,463 bags to about twice that amount. Three thousand six hundred and ninety acres out of the total planted to this crop, were grown for green manuring.

Green Manuring.—At long last the agricultural community appears to have thoroughly awakened to the value and importance of green manuring as a means —in conjunction with the use of artificial fertilisers—of maintaining soil fertility.

At a recent meeting of the Executive Committee of the Maize Association the statement was made, and not refuted, that " there was no occasion for the Department of Agriculture further to demonstrate the advantages of green manuring, for farmers were already convinced of this, and their only difficulty was the financial one of throwing large areas out of maize and into green manure crops." This difficulty, however, must be faced and faced courageously if the worn-out maize lands of the Colony are to be restored to profitable productivity. It is to be trusted that newer settlers on the land will be warned in time, and will commence green manuring before their soils are seriously impoverished. If they do so, the high average yields thus maintained will more than compensate for the acreage annually thrown out of directly profit-earning crops.

Increased interest in this essential practice is evidenced by preliminary figures supplied by the Statistical Bureau. In 1928 the total area under green manure crops was given as 3,177 acres, whereas for 1929 it is estimated to have been 14,704 acres, and from all reports received, a further large increase will be recorded for the forthcoming season.

Horticulture.—The Horticulturist was absent from the Colony on vacation leave from the 24th July to the 25th November. Previous to proceeding on leave he devoted 102 days to extension work, visiting 235 farms in Mashonaland and 28 fruit growers in Matabeleland. Eleven lectures and orchard demonstrations were given before local gatherings of farmers.

Citrus Fruit.—Referring to citrus fruit export, the Horticulturist reports:—

" A slight decrease is recorded in the number of cases exported, the total for the year amounting to 169,571 cases as against 178,000 cases in 1928. The reduced output is attributed to unfavourable weather during the early setting of the fruit crop. Of these exports 130,908 cases were shipped through Cape Town, and 38,663 through Beira, the latter constituting an increase of about 2,000 cases on the Beira export during 1928.

" Unfortunately, the price realised for citrus fruit this season has been extremely low, an average of only about 15/- a case being obtained compared with 25/- a case in the previous year. The reduced price is largely attributable to foreign competition on United Kingdom markets from the United States of America and Brazil.

" Very little extension in the planting of citrus trees in Southern Rhodesia is to be recorded, existing estates having confined their activities chiefly to the replanting of unprofitable groves.

" **Fruit Tree Introductions.**—The introductions of improved varieties of Pecan nut and Avocado pear made last year have provided a limited number of trees, from which bud-wood will be obtainable. Success has also attended the introduction of Pecan nut seed, and a good number of young trees have been raised by interested farmers, and on the Salisbury Experiment Station, for distribution purposes.

" Ten different varieties of Almond were raised from seed at the Salisbury Experiment Station, and the young trees were sent to the Rhodes Inyanga Estate, where so far they are doing well.

" **Deciduous Fruit Plantings.**—Further small commercial plantings of deciduous fruits, principally apples, have been made in the eastern districts and the Umvukwes, and a fair supply of good quality fruit should be forthcoming from these areas before long.

" The home orchard, situated on typical granite sand at the Tobacco Experiment Station, has continued to make excellent growth, and has been very well cared for."

Tea and Coffee.—Messrs. Ward and Phillips, of New Year's Gift, Melsetter, are reported to evince continued satisfaction with their plantings of tea on that estate, and are understood to intend to still further increase the extent of their gardens this season. Tea seedlings are now being raised from seed grown on the property, and those who have sampled the flavour of the commercial tea produced speak highly of it.

The local prospects for Coffee have recently formed the subject of an inquiry by Mr. N. D. Trench, a recognised authority on the subject from Kenya Colony. This gentleman's report has not come to hand at the time of writing, but it is understood that in general he is not very favourably impressed with Rhodesia's coffee prospects, though he considers that in certain localities and on carefully selected sites, the crop can be grown commercially to a limited extent.

As a result of Mr. Trench's representations, steps have already been taken to introduce seed of two varieties specially recommended by him.

Government Farms and Experiment Stations.—Satisfactory progress and a successful year's working can be recorded for all these institutions. Additional buildings and fencing have been erected at the Gwebi and Matopo Farms, and the value of the livestock kept at these two centres has been greatly enhanced by the importation from Great Britain of 10 pedigreed Shorthorn heifers and two bulls for the first-named farm. For the Matopo Farm, pedigree Red Poll, Jerseys and Ayrshire cattle were obtained, and the position of these herds at the time of writing is as follows:—

Red Polls—2 bulls, 3 cows, 8 heifers and 3 calves.

Jerseys—1 bull and 9 heifers.

Ayrshires—1 bull, 1 cow, 8 heifers and 1 calf.

The Gwebi Farm, in what to most farmers at this end of the country proved a most unfavourable season, produced an average of rather more than 9 bags of maize an acre over 414 acres, while the Matopo Farm produced a little more than 10 bags an acre over 200 acres.

The farm costing system in vogue at the Gwebi farm has been placed on a very satisfactory basis, due to the keenly interested and greatly appreciated co-operation of the Accountancy Staff of this Department, and to the provision in that branch of one officer to give as much time to these costings as the circumstances may demand. Full information on numerous aspects of agricultural costings on this farm will very shortly be available and should prove of paramount interest and importance to all engaged in a farming occupation.

The Tobacco Experiment Station was unfortunate in experiencing an acute outbreak of eel-worm or nematode on the tobacco crop, and this, coupled with an unfavourable season, resulted in low yields of leaf of poor quality. The outbreak is attributed, by the Manager, to the fact that the usual water supplies failed and it was necessary to water the tobacco seed beds from muddy water-holes dug in the almost dry bed of the river. In co-operation with the Entomological division, an extensive series of experiments on eel-worm control has been laid down for the coming season.

On the other hand, surprisingly good yields were obtained from many of the experimental maize plots and much useful information has been gained in regard to the growing of this crop on sand veld soils. Experimental work with other crops than tobacco was considerably extended and greater attention was devoted to trials with winter cereals and clover varieties on vlei land. Good crops of wheat, oats and rye were grown on such land without irrigation.

The Gwebi Farm.—The rainfall at this centre totalled 31.02 inches, of which 21.6 inches fell between the middle of December and the 8th February. Maize remained the principal crop of the farm and 414.7 acres yielded a return of 3,760 bags. A further 218 acres were planted to various grains and stock feed crops, including 82½ acres under sunn hemp and dolichos beans for green manuring. Ground nuts returned only 9.5 bags an acre, but dolichos beans, of which 109 tons of hay were made, yielded an average of 2 tons of hay per acre. Kinvarra oats gave up to 7 bags of grain an acre.

Three hundred tons of veld hay were cut for feed and bedding.

The total value of crops or products raised and/or sold during the twelve months was:

	£	s.	d.
All crops, excluding veld hay, taking maize at a value of 7s. 9d. a bag	2,213	19	6
Dairy herd, by sales of cream, milk and butter, and credits for separated milk fed to calves and pigs at 2d. per gallon	921	11	9
Dairy herd by sale of pedigree bulls	210	0	0
Sales of fat oxen	1,311	16	10
Sales of pigs	407	5	9
Total	£5,064	13	10

It should be noted that butter and milk sales are practically confined to the European staff, and settlers resident on the farm—the latter at no time exceeding four families.

The final payout price for the maize is not yet known and the figure of 7s. 9d. a bag for this product is based on an average between the estimated selling price of that portion of the crop which was sold, and a fair average price for the remained of the grain which is retained on the farm for home consumption.

In the course of his report the Farm Manager refers to the following matters of particular interest:—

"**Friesland Herd.**—At the close of the farm year, on the 30th September, the pedigree herd numbered 51 and the grade herd 71 head. Births during the year amounted to 37, of which 13 were grade bull calves, destroyed a few hours after being born. Five deaths occurred from sickness or accident. Four young pedigree bulls were sold in August at ages between 16-18 months, and realised profitable prices.

"The average number of cows (pedigree and grade) in milk during the year was 24.6 and the average daily milk yield per cow was 32.3 pounds, the total output of milk from the herd being 290,059 pounds. The following were the unofficial milk records of the six best pedigree and six best grade cows in the herd:

Name.	Milk in lbs.	Butter fat in lbs.	Average butter fat in lbs.	No. of days.
*Melrose Clara	21,452	659.8	2.88	425
*Melrose Carrie	12,936	335.3	2.59	335
*Mimosa Pel Clara	10,924	374.6	3.42	350
*De Grendel Bessie Burger	10,360	346.9	3.34	248
*Gwebi Laura	9,024	292.3	3.01	323
*Maandag	8,041	301.1	3.7	287
Gladys	14,434	452.6	3.1	400
Elsie	11,115	377.4	3.8	290
Palm Tree Allie	10,753	335.5	3.1	293
Clara	9,043	335.7	3.7	201
Katie	5,875	169.1	2.7	168
Lucy	5,642	169.3	3.0	204

*Indicates pedigree cow; the remainder are grade animals.

"**Shorthorn Herd.**—Ten pedigree heifers and two bulls, imported from Great Britain, were drafted to the farm in July, after having been at the Matopo farm for about three months. This stock appears to be acclimatising satisfactorily and four of the heifers are now in calf.

"**Slaughter Stock.**—Forty ranch bullocks were purchased for feeding, at a price of £6 10s. each, and in all seventy-nine head including old trek oxen and home bred steers were fattened. Of these, twenty head were exported to England, 17 were disposed of at the Salisbury Agricultural Show sales and the remainder were either sent to Johannesburg, or sold locally.

" **Pigs.**—An average of six sows has been maintained during the year and a few weaners have been purchased for fattenings. The Middle White-Large Black cross has continued to do well and baconers have been got away in $4\frac{1}{2}$ to 5 months.

" **Sheep.**—The entire flock has been disposed of and it is proposed to keep the farm free of sheep for 12-18 months.

" **Salisbury Show.**—Forty-six animals were exhibted on the last Salisbury Show, namely 25 Friesland, 4 Shorthorns, and 17 slaughter bullocks. The awards gained were as follows:—Friesland: 1 Reserve Champion (bull), 8 firsts, 8 seconds, 4 thirds, and 1 special (best dairy cow). Shorthorns: 1 Reserve Champion (bull) 3 firsts, 1 second and 1 third. Fat Stock: 1 second for single ox.

" The standard of quality in the fat stock classes was extremely high.

" **Buildings.**—Two rooms have been added to the Manager's quarters and the existing verandah has been considerably widened. A new range of piggeries comprising 7 sties was erected. Alterations and improvements have been made to the cow byres, and the sides of the grinding shed were bricked in, an excellent grinding floor and granary being thus provided.

" **Forestry and Fencing.**—Approximately five acres of gums were planted. Two additional paddocks were fenced-off near the avenue, and one of the large river paddocks was subdivided.

" The new motor road along the eastern boundary of the farm to connect the Sinoia road with certain farms across the Gwebi river was completed.

" **Maize Experiments.**—A series of large scale maize, green manuring and phosphatic fertiliser trials was commenced this year at the request of the Maize Association, sixty acres of land—to be increased to eighty acres in 1929-30—being devoted to this purpose. These trials must continue for several years before any useful deductions can be drawn from them. An average if 8 bags of maize an acre was obtained from the 40 acres of first and second year land, which received fertilisers but has not yet been green manured."

Practical Training.—The system introduced three years ago of inviting young farmers, particularly interested in dairy and pig farming, to spend two to three weeks on the farm studying the methods of feeding and management followed, and the food crops grown, has continued to receive support and a considerable number of young men intending to give special attention to these lines of farming have taken advantage of the scheme.

Maize Costs.—The present report is not the place in which to deal at length with the results of the costing system in vogue. Full particulars will shortly be made available to the public through the medium of the Agricultural Journal. Meanwhile it may be stated that, making no charge for interest on working capital or capital invested in the land, the cost of producing the nine bags an acre maize crop was 5s. 11.85d. per bag. In this figure is included all the current year's costs of preparing the land for the crop, but it does not include the proportional cost of the green manuring, nor that of farm manure and fertilisers applied in the previous farm year, nor are the charges for ox labour and depreciation on implements employed in preparation of the land during the last few months of the previous year included. Entirely dependable details of cost of these operations, performed in the previous financial farm year, are not available and if full allowance is made for these items, the cost of production of this particular crop will approximate 7s. a bag.

Table " A," which follows, give the detailed cost of the crop in question, while appended to this are figures shewing the cost of ox labour on the farm during the year.

SCHEDULE NO. 1.—MAIZE ACCOUNT: GWEBI FARM.

Showing the cost of growing maize at the Government Farm, Gwebi, during the season 1928-29. The total area under maize was 415 acres, which yielded 3,760 bags of grain or an average of 9.06 bags per acre, at a total cost of £1,125 9s. 10d., being 5s. 11.85d. per bag.

STATEMENT A.

Showing a division of the costs between the operations, materials used, and depreciation, etc., on implements.

	Average cost per acre.	Average cost per bag of maize.	
	£ s. d.	£ s. d.	Percentage.
Preparation of Lands	5 3	6.95	9.59
Fertiliser: Artificial	5 2	6.84	9.57
Fertiliser: Farm Manure @ 10s. per ton	5 10	7.73	10.79
Seed @ 32s. 6d. per bag	3 11	5.19	7.24
Planting by machine (211.9 acres)	5	0.55	0.67
Planting by hand (203.1 acres)	1 8	2.21	3.14
Cultivations (machine and hand)	3 0	3.97	5.50
Thinning (hand planted)	3	0.33	0.48
Harvesting	3 5	4.53	6.36
Maintenance and Depreciation of Machinery and Tools	4 3	5.63	7.78
General (items which cannot more precisely be allocated)	2 10	3.75	5.23
Sub-total	1 16 0	3 11.68	66.35
Shelling	1 1	1.43	1.96
Bags and Twine (second hand bags for maize kept on farm)	9 6	1 0.59	17.51
Carting to Store and Siding	3	0.33	0.48
Sub-total	2 6 10	5 2.03	86.30
*Proportion of Salaries of Manager and Assistants and Allowances not otherwise allocated above	7 5	9.82	13.70
TOTAL	2 14 3	5 11.85	100.00

STATEMENT B.

Showing a division of the costs under the heads of labour, materials used and depreciation, etc., on implements.

	Average cost per acre.	Average cost per bag of maize.	
	£ s. d.	£ s. d.	Percentage.
*Proportion of Salaries and Allowances of Manager and Assistant	7 6	9.93	13.88
Native labour, including food	13 3	1 5.55	24.38
Ox-labour (subsequent to 1.10.28)	5	0.55	0.80
Stores (see note below)	1 4 9	2 8.78	45.52
Maintenance & Depreciation Machinery and Tools (As Table A) 4s. 3d.			
Add amount charged to Preparation of Land and Shelling 1s. 8d.	5 11	7.84	10.95
General	2 5	3.20	4.47
	2 14 3	5 11.85	100.00

*Proportion of salaries and allowances of Manager and Farm Assistant. The differences between the figures shewn for this item in statements A and B is due to a proportion being included under "preparation of land" in statement A.

NOTE.—The item stores includes cost of fertilisers, bags, twine, seed and paraffin and petrol used in shelling the maize. The farm year runs from the 1st October to the 30th September. Preparation of land includes amongst all other operations, the distribution of fertilisers and farm manure. The cost of fertilisers represents the proportion of the cost charged against this year's crop. The residual value of the fertiliser is charged to succeeding crops. The corresponding charge from previous years should be added to Statements A and B. Owing to the fact that this is the first year of detailed costings at Gwebi, exact figures for these items are not available, but the following estimate is based on the actual figures of this year's carry over.

Seventy per cent. of the cost of the artificial fertiliser applied is charged against the first crop, and the remaining 30 % against the succeeding crop, all the lands receiving fertiliser every second year. In the case of farm manure 50% of its value, at 10/- per ton, is charged against the crop to which it is directly applied, 25% to the next crop, and 12½% to each of the two following crops. Where green manuring has been practised 50% of the cost is charged against the crop which immediately follows, 35% against the second crop, and 15% against the third crop, the land being green manured every fourth year.

TABLE A.

	Cost per acre.	Cost per bag.
	£ s. d.	£ s. d.
As previously shown	2 14 3	5 11.85
Estimated additional cost	9 1	1 0
Total cost after allowing for residual value of fertilisers, farm manure and green manure crops from previous years	£3 3 4	6 11.85

Fertilisers and Farm Manure were applied as under:—

Fertiliser or Manure.	Quantity per acre.	Acreage.
Farm Manure	8 tons	60.7
Bone and Superphosphate	200 lbs.	83.5
Ditto	150 lbs.	110.3
Rock Phosphate	200 lbs.	20.0
Untreated	—	140.5
		415.0

SCHEDULE NO. II.

COST OF OX LABOUR.

The system in operation at the Gwebi farm for the allocation of costs of the work done by oxen is as follows:—

The driver of each span is issued with a book containing one ticket for each day of the month. The assistant in charge marks up the hours worked and the work done daily by each span. These books are handed in at the end of each month and the details are summarised.

Grazing in fenced paddocks is charged at 6d. per head per month, this figure having been arrived at as an average of figures given by a number of leading farmers who were consulted in the subject. The items native wages and food are in respect of services rendered to the oxen in dipping, dosing and supplying licks, etc.

The number of working oxen kept on the farm during the year was as follows:

1928.	No. of Head.		Amount charged for Grazing.
			£ s. d.
October	119	.....	2 19 6
November	117	.....	2 18 6
December	117	.....	2 18 6
1929.			
January	116	.....	2 18 0
February	116	.....	2 18 0
March	116	.....	2 18 0
April	116	.....	2 18 0
May	116	.....	2 18 0
June	116	for 15 days	3 6 0
	148	,, ,, ,,	
July	148	.....	3 14 0
August	148	for 11 days	3 19 2
	164	,, 16 ,,	
September	164	.....	4 2 0
			£38 7 8

DETAILED COST OF WORKING OXEN.

	£ s. d.	£ s. d.
Grazing: In fenced paddocks		38 7 0
Proportion Manager's Salary and Allowances	1 16 3	
Portion Stockman's Salary and Allowances	1 12 2	
Native Wages	2 17 1	
Native Food	0 15 6	
Cash Payments, Medicines, etc.	1 15 3	
Stores Account: Dip, Salt, Bone Meal, etc.	12 0 7	
		20 6 10
		£58 14 6

Total number of ox hours worked during year	183,422
Cost per ox-hour	0.076,839 pence
Cost per ox-day worked	0.61 pence approx.

No allowance has been made for depreciation since oxen are bought when young, worked for 2-4 years and then fattened and sold for as much or more than they originally cost.

The Matopo Farm.—This institution has continued to make excellent progress under the management of Mr. Mainwaring, and the following extracts are from his annual report:—

"**The Season.**—The climatic conditions of the past year were much more favourable to the farmers in Matabeleland than the one which preceded it. Last year there was a long drought relieved only by a few heavy and precipitate rains. This year abundant rains fell during the summer and they were more evenly distributed over a longer period than is usually the case, with the result that the ground became thoroughly saturated and springs and dams were effectively replenished. The season continued open until late into the autumn with a marked absence of early frosts, whilst the winter itself was neither severe nor prolonged. The rainfall recorded here was as follows:—

October, 1928	.04 inches.
November	4.53 ,,
December	8.98 ,,
January, 1929	7.13 ,,
February	9.17 ,,
March	5.06 ,,
April	.17 ,,
Total	35.08 inches.

"**Insect Pests.**—The only insect pest of importance to be recorded is the army worm which appeared in certain areas in overwhelming numbers, causing great damage, particularly to late planted maize. Curiously enough, this pest proved beneficial to the veld set aside for hay purposes by eating down the grass during the heavy rains and retarding its growth. With the disappearance of the worm, a strong second growth was soon made and haymaking operations were carried out in the best of weather.

"**Crops Grown on the Farm.**—Maize was the principal crop grown and the return of shelled grain proved a record for the farm, a yield of 2,106 bags being obtained from 200 acres. Late planted, early maturing maize varieties, occupying 120 acres, were completely destroyed by army worm.

"Of the maize varieties, Hickory King gave the best results, followed by Salisbury White; Potchefstroom Pearl suffered somewhat from water logging on heavy black soil.

"Silage amounting to 120 tons made in pits was cut from 72 acres of poor maize which had suffered from attack by army worn.

" Veld hay amounting to 225 tons was secured in first-class condition. An excellent crop of dolichos beans for hay and seed was reaped from 28 acres. This bean is now recognised in Matabeleland as the most useful and profitable leguminous crop to grow for hay and green manuring.

" A five-acre field planted to sunflower yielded fifty bags of seed. Ground nuts did not prove a success, the soil becoming very hard, and the land was also badly washed. Pumpkin and Kaffir melons were both practically failures, owing to the sand veld on which they were planted becoming water-logged.

" **Experimental Plots.**—Trial plots of interest and educational value, and of one-tenth to one-twentieth of an acre were grown of the following crops:—

" Haricot beans, 10 varieties; Soya bean, 6 varieties; Dolichos bean 4 varieties; Velvet bean, 2 varieties; Linseed, 2 varieties; Sunflower, 4 varieties; Ground nuts, 2 varieties; Kaffir corn, 3 varieties; Millets, 2 varieties; Tobacco, 2 varieties; Sweet potatoes, 6 varieties; Cotton U, 4; Sunn hemp; Buckwheat; Teffgrass; Sudan grass; Tepary bean; Phaseolus Helvolus; Maize manurial trials, 3 plots.

" **Winter Cereals under Irrigation.**—Eight acres were planted with 42 varieties of wheat, oats and barley for experimental purposes, and valuable results were obtained. Trial plots of wheat from 1 to 2 acres in extent were sufficiently large to produce a quantity of seed for sale and distribution of those varieties that could be recommended.

" Oat forage was grown on sixteen acres; four acres of green barley were grown for stock feed, and sixteen acres were put down to oats for the purpose of providing winter pasture for sheep.

" **Sale and Distribution of Seed.**—Very gratifying results were secured from the seed maize sold from this farm during the previous year. Farmers state that it gave every satisfaction both in respect of yield and quality, and maize grown from this seed secured premier honours at the Bulawayo and Salisbury Agricultural Shows.

" A further 100 bags of carefully selected seed maize has been sold this year and also 30 bags of selected seed wheat. Farmers are thus being given an opportunity to obtain first-class seed at reasonable cost. Good, reliable seed is very difficult to secure in Matabeleland. Many seed samples have been examined and the results show that a large amount of the seed imported and sold in this Colony is of deplorably poor quality. The reason for this state of affairs is clearly a want of knowledge on the part of the farmer and seedsman.

" **Pasture Research.**—Important work in this direction has been inaugurated under the direction of the Chief Chemist, and for this purpose 300 acres of grazing land on the western portion of the farm have been handed over to him.

" **Livestock.**—Three small herds of pedigree cattle imported from Great Britain, and comprising Red Polls, Ayrshires and Jerseys, were placed on the farm during April, May and June. Considering their poor condition on arrival and the change of climate with which imported stock have to contend, their health has on the whole been good and losses have not been exceptional. The establishment of such herds will be of great value to those farmers who are aiming to make dairying their principal business.

" Mortality amongst these animals has been as follows:—Red Polls: Two heifers died of acute gastritis almost immediately after arrival. Ayrshires: Two heifers died of acute gastritis. Jerseys: One heifer died of gastritis.

" There are also on the farm Grade Frieslands, comprising 29 cows, 11 heifers and 14 heifer calves.

"**Merino Sheep.**—A small flock of merino sheep, consisting of 3 rams and 100 ewes was imported from the Cape Colony at the end of March. Immediately after their arrival they became affected with "blue tongue," from which 21 ewes died, and unfortunately on account of this disease abortions were frequent. The flock has been inoculated against this disease for the coming wet season. No further losses have occurred, and the sheep are now thriving exceedingly well.

"Shearing was in October, the rams giving 24, 22 and 20 lbs. each respectively, and the ewes averaging 9 lbs. of wool each.

"**Pigs.**—The breeds kept are Large Whites and Large Blacks. The demand or these animals from farmers has been very encouraging.

"**Bullocks.**—Eighty Lincoln Red grade bullocks were fattened in pens and sold at a profit on the Bulawayo and Johannesburg stock markets.

"**Improvements.**—During the year the following work and improvements have been carried out with the ordinary farm labour:—

1. Milling house.
2. Extension to implement shed.
3. Sheep dip.
4. Shelter for sheep.
5. Additional paddock fencing.
6. Thrashing floor, 50 x 25 yards, brick and cement.
7. 120,000 of good quality bricks made and burnt.
8. Gravelling farm roads.
9. Forestry.—During the rains tree planting for ornamental purposes, avenues, wind-breaks and timber was continued, and several thousand seedlings were pricked out into tins.

"Many of the trees planted two years ago have done exceedingly well and are now 8ft. to 10ft. high.

"**Correspondence.**—The number of letters received and despatched has steadily increased during the past year and there has been a noteworthy growth in the number of applications for information regarding farming problems.

"**Visitors.**—Progressive farmers are taking a keen interest in the farm and the number of visitors is rapidly increasing; sometimes a whole day is occupied in showing visitors round and explaining the work in progress.

"**Farmers' Day.**—The second annual "Farmers' Day" held on March 19th proved a very successful event, notwithstanding the flooded state of the rivers and the heavy roads. Two hundred and eighty visitors were in attendance.

"In conclusion I desire to express my appreciation of the support received from the staff in carrying out the large amount of work undertaken during the past year. I desire also to tender my thanks to various officers of the Department for their hearty co-operation in matters connected with the varied operations on this farm."

Itinerant Duties.—During July the Farm Manager attended Farmers' Association meetings at Inyati, Essexvale and Redbank and visited many farms in the Bulawayo area. He also acted as judge in farm produce classes at the Bulawayo, Gwelo, Salisbury and Fort Victoria Shows.

For the Bulawayo Show a special collection of farm crops was prepared and exhibited.

Salisbury Experimental Station.—The following are extracts from the report of the Manager of this Station:—

"The rainfall during the period under review was evenly distributed, and since it amounted to 32 inches the season on the whole was a favourable one.

"Experimental work mainly consisted of a continuation of investigations in progress during previous years, a full report of which was published in the April, May, June and July issues of the Agricultural Journal.

"The rotational cropping systems commenced a number of years ago, continue to furnish valuable information, and are a source of considerable interest to visiting farmers.

The numerous experiments with maize include one commenced this year at the request of the Maize Association, which is designed to investigate the effect of different methods of applying fertiliser to the land. Four different methods were under trial, namely—(a) broadcasting the fertiliser in the winter months; (b) broadcasting the fertiliser on the ploughed land a week or two before sowing the crop and harrowing it in; (c) drilling the fertiliser in the furrow with the seed at planting time; (d) applying the fertiliser in the hole with the seed at planting time.

"Each of these methods was replicated four times on randomised plots covering two acres. Analysis of the yields obtained failed to show any significant difference in favour of either of the methods. The reason for this may have been due to the favourable weather conditions which prevailed and particularly to the soaking rains which fell at the beginning of the season. The trials will be continued over several years in order that the effect of seasonal differences, if any, may be revealed.

"A method of accelerating the sprouting of "seed" potatoes, evolved by the Entomologist in Java, has been tested here, and found to be effective and simple. It is inexpensive and requires no special equipment and may well prove of considerable value to potato growers. Full particulars of this method have been published in the Agricultural Journal, and several farmers have already reported upon it very favourably.

"In the past, considerable difficulty has been experienced in transporting sweet potato tubers over long distances, for propagation purposes, since they often arrived at their destination in an advanced stage of decay. It has been found that if the tubers are first dipped in lime-wash and after drying are packed in boxes they travel much better. Experimental consignments railed to Fort Victoria and Bulawayo reached their destination in satisfactory condition, and it is hoped that a means has thus been found of distributing our improved varieties of this crop over a much wider area than was formerly possible.

"Increased attention has been paid to pasture-grass experiments, with the object of obtaining species which are capable of yielding pasturage of higher quality and in greater quantity than the natural veld. Several grasses introduced from overseas have been under trial for the past ten years, but with the possible exception of one or two, suitable only for wet or irrigated lands, they are not as useful as indigenous African species. Investigations into the ability of the most promising dryland grasses to withstand close grazing at frequent intervals, were commenced this year.

"As usual, collections of grains and fodders and sheaves of grasses, etc., grown on this Station were staged at the local Agricultural Shows, excepting Bulawayo. Similar collections were sent to the London Office of the High Commissioner, and to the Imperial Institute for publicity purposes.

"Eighty-five introductions of new crops, or possibly improved varieties, were made during the year, including a small sample of seed of the much advertised new fibre plant 'Brotex.' Free parcels of seeds and plants made from the Station were as follows:—

"To farmers in Rhodesia, 540; to Government Institutions in Rhodesia, 110; to Overseas Experiment Stations, 115.

"Six acres of land were handed over to the Poultry Division on which to establish an experimental and demonstration poultry farm and for enlargement of the accommodation for the Rhodesia Egg-Laying Test. To compensate for the loss of this valuable grazing land on which certain pasture experiments were in progress, it was found possible to acquire an additional ten acres of commonage land at the north end of the Station. Transfer of this land to the Government has been effected.

"**Tobacco Experiment Station.**—As already stated, the scope of the experimental work undertaken here was enlarged to embrace a number of

other crops besides tobacco, both with the object of acquiring information as to the behaviour of these crops on sand veld under different methods of treatment, and to afford the apprentices a more varied training in general arable farming. The investigations in progress may be classified as follows:

(a) Fertiliser experiments with tobacco and maize.
(b) Tobacco variety trials.
(c) Test of various rotations for the tobacco crop.
(d) Cultural experiments with tobacco and maize.
(e) Rotations thought suitable for sand veld soils employing crops other than tobacco.
(f) Variety trials with various legumes.
(g) Various experiments conducted in co-operation with other Divisions of the Department.
(h) Fertiliser and variety trials with winter cereals on vlei soils.
(i) Experiments with clover varieties on vlei soil.

" The total area under annual crops was 90 acres, of which 20 acres were planted to tobacco.

" The small grade Friesland herd has continued to do well and all apprentices receive instruction in the care, feeding and management of dairy cattle. The milk records of the eight cows were as shewn below :—

Name.	Lactation period.	No. of days.	Milk in lbs.	Remarks.
Nell	Third	363	10.000¾	
Molly	Third	278	5.501½	
Polly	Third	335	7.088½	
Mabel	Third	223	6.279½	
Bertha	Third	353	6.961	
Olga	Third	320	3.711½	Sold.
Dorthea	Third	166	5.212	
Nellie	First	99	4.104	Bred on Station.

In the course of his report for the year the Manager of the Station makes the following observations :—

" The herd supplies the Staff and Apprentices with abundant milk throughout the year and serves generally as an excellent demonstration of what can be done with this class of cattle on the sand veld, in which visitors to the Station are much interested.

" One unprofitable cow was sold during the year and one heifer (the first calf to be born on the Station) was repurchased from Gwebi Farm. This animal, Nellie, is now giving four gallons of milk per diem. The bull, Gwebi Hugo, was loaned to this Station for some months by the Gwebi Farm and was subsequently prepared for exhibition and sold at the Salisbury Show in August for £45. Five calves were born during the year. The heifer calves are retained till they are five to six months old, when they are sold to Gwebi Farm to be brought back again later when in calf, there being insufficient accommodation here to permit of the rearing of young stock. It is hoped that suitable calf pens and paddocks will shortly be completed, when this practice will be discontinued.

" **Tobacco Seed.**—Five pounds of carefully selected tobacco seed, including a number of new varieties which have been tested on the Station, were available for distribution amongst planters.

" **Show Exhibit.**—A comprehensvie exhibit of the various crops grown on this Station was exhibited at the Salisbury Agricultural Show.

" **Development Work.**—Ten acres of new land were stumped and ploughed in preparation for next season and a further five acres of vlei land were put under cultivation. Approximately 25,000 Eucalyptus trees were planted. A large area round the cattle sheds was stumped and cleared of all under-growth and bush, couch grass being planted in the bare patches and the grazing generally improved by the application of wood-ash from the tobacco barns. Approximately 80,000 bricks were made and burnt.

Two new roads to the seed beds and vlei lands were made: an implement shed and bull box was built and a bathroom was added to the Matron's quarters.

"**Apprentices.**—At the end of July the third batch of Apprentices completed their two years' course of instruction and passed out. All except one satisfied the examiners sufficiently to gain the Station Certificate. Two of the best Apprentices on the Station were seconded to assist the Mycologist in his experiments on control of White Mould in tobacco. Eight new apprentices joined the Station at the beginning of the new term and at present there are fourteen receiving instruction.

"**Apprentices' Plots.**—This method of practical instruction continues to be most satisfactory, the majority of apprentices showing a marked keenness in the crops which they grow entirely by their own efforts. The element of competition increases the keenness and generally raises the standard of efficiency.

"**Lectures and Tours.**—Lectures were given twice weekly during the greater part of the terms, either by the Manager or by Officers of the Agricultural Department. Educational day visits were made to: Salisbury Experiment Station; The Government Farm, Gwebi; The Rhodesian Tobacco Warehouse; and Messrs. Newmarch and McLean's Farm, Glenara, near Salisbury.

"**Recreation.**—The Sports Club and Library serve their purpose in providing recreation out of working hours and the Cadet Platoon continues to carry on its parades.

"**Staff.**—Mr. R. J. Sang was appointed Assistant in September, 1928, and acted as Manager during the Manager's five months absence on vacation leave. The Matron, Mrs. Hewetson, who held the post since 1927, resigned on the 1st May, 1929, her place being taken by Mrs. Kingcome, who resigned at the end of November and was succeeded by Mrs. Gasson."

It is to be regretted that the parents and guardians of more Rhodesian youths do not take advantage of the free agricultural training provided at this centre. At present the class of boy for whose benefit this scheme was inaugurated is not making use of it.

Bulawayo and Gwelo Demonstration Stations.—These two Stations are serving a useful purpose, primarily by affording much valuable information to the Field Crop Officers of the Department, but also to those farmers sufficiently keen and interested to pay the Stations occasional visits of inspection.

In connection with the maize rotation experiments on the Bulawayo Station, it is of interest to record that the average maize yield over six years in the rotation consisting of—maize, with 200lbs. superphosphates, velvet beans ploughed under, maize with 200lbs. superphosphates, oats, is a fraction less than the average yield in the comparative rotation which consists of—maize with 7 tons farm manure per acre, velvet beans reaped, maize with 200lbs. superphosphates per acre, Sudan grass, the relative average returns being 11.8 bags as against 11.5 bags an acre. These results are of particular interest in view of the doubt sometimes expressed as to the wisdom of green manuring in areas of low or uncertain rainfall. The fact, too, that under similar conditions, applications of 200lbs per acre of fertiliser have not proved too heavy, is of importance.

The Gwelo Station on red soil has continued to provide a valuable arable farming demonstration for that section of the country and here also in the rotation trials, one green manuring every fourth year, combined with two applications of 200lbs. per acre of superphosphates during that period, has maintained the land at a similar standard of fertility as has one application of 7 tons farm manure per acre and one dressing of 200lbs. superphosphates per acre.

These additional proofs of the value of green manuring as a means of maintaining soil fertility can not fail to have great significance in the future development of Rhodesian farming, for on very few farms in this Colony are supplies of farm manure likely to be at all commensurate with the needs of the arable land.

Results on the granite land section of this Station have repeatedly been handicapped by the shallowness of the soil and lack of drainage, in dry years the crops suffering from drought and in unusually wet seasons from the land becoming waterlogged. In spite of these defects coupled with extreme poverty of soil, all the proved leguminous and many other fodder crops have done extremely well, and their behaviour has demonstrated that even on such land the stock farmer can readily produce large supplies of leguminous and other fodders for winter feeding.

Maize Grading and Export.—The grading of maize and maize meal was practically continuous throughout the year and two permanent graders were kept almost constantly employed on this duty. Additional temporary graders were engaged from the middle of May onwards, and when at full strength the staff numbered six. The bulk of the export trade had been dealt with by the middle of October, and by the end of that month the staff had again been reduced to two. Temporary graders were put through a course of training, lasting from 3-4 weeks before being permitted, unaided, to undertake grading duties.

Inspection of the new crop commenced on the 15th July and by the 23rd of that month requests for the services of graders were being received from all maize producing areas.

The Senior Grader was this year for the first time provided with motor transport, and this added materially in expediting the work and allowing for more frequent supervision of the operations of the temporary graders.

Number of Bags Graded.—Approximately 815,000 bags of maize and 30,000 bags of meal were graded, of which 800,000 bags were passed as No. 2 grade maize. These figures shew an increase of about 100,000 bags in comparison with the year 1928.

Maize Export Regulations.—A conference was held at Beira in June between representatives of the Government of the Mocambique Territory and of Southern Rhodesia, to discuss the proposals of the first named Government for amendment of the regulations controlling the export of maize through Beira. The agreement finally arrived at bids fair to satisfy the requirements of both countries, and the amended definition of weevily and slightly weevily maize should prove of material benefit to maize growers.

The following observations are extracted from the annual report of the Senior Grader:—

> " **Moist Maize.**—The same trouble was experienced with moist maize as was encountered two years ago. Farmers seem to use no discretion in the separation of wet and dry maize, which results in consignments being turned down on every railway line either owing to the whole consignment or part of it being wet.
>
> " Numerous samples were received by this Department for testing, the results being made known to the sender as soon as possible. Yet very many growers still brought their maize to the railway only to have it turned down on account of excessive moisture and to have it left for six or eight weeks, eventually to be graded as ' slightly weevily ' or railed for local consumption.
>
> " **Sowing of Bags.**—The sowing of bags was more carelessly done than in either of the past two seasons. On the Umtali-Gwelo section this can be overlooked owing to the majority of the farmers being either new settlers or those who have never exported maize before. The same excuse does not hold good for producers in the main maize belt areas. At least 60% of the rejects were due to bad sowing or patched bags and these faults can only be due to neglect and lack of supervision on the part of the farmers.
>
> " **Quality of Grain.**—The Lomagundi grain was an excellent sample containing only a small percentage of diplodia-infected kernels or broken grain. The Mazoe grain was up to its usual standard, but inferior to that from Lomagundi owing to a higher percentage of discoloured and defective berries. The grain on the Umtali-Gwelo section was of fair quality and comparatively free from diplodia, but the berries were small and irregular in shape due to the use of inferior seed.

"**Moisture Tests.**—Owing to the large quantity of wet maize encountered at the beginning of the season and to the larger staff of graders employed, the number of moisture tests taken was higher than in previous years. The figures were as follows:—

"Tests made in Salisbury, 330; Tests made along the railway line, 366; total, 696."

Witch Weed Control Experiments.—These experiments have been carried out for one season on three farms in the Mazoe Valley, and are under the supervision of Mr. Timson, Assistant Agriculturist. During the coming year 16 different experimental treatments will be in progress, on 19 plots on the three farms.

The principal results from the last year's work, owing to the nature of the experiments, will not be available until the end of the coming season, but the following preliminary observations may be recorded:—

1. The good effect of dressings of 200lbs. per acre of superphosphate, Rock phosphate, or bone and superphosphate, in assisting witch weed infested maize land to yield better returns of grain. Superphosphate and bone and superphosphate gave the more marked results.

2. Yields of over 13 bags per acre of ground nuts were obtained on two farms, where the crop was planted after the ploughing under of a trap crop of maize or Sudan grass.

3. Although the growth of witch weed was checked to some extent by ridging up the maize after the parasite appeared, yet this would hardly be a practical method on most farms, since mules, donkeys or single oxen driven either alone or in tandem would be necessary for drawing the ridging plough, the witch weed chiefly coming above ground after the maize is too high to allow of two oxen abreast being used for this work.

4. On all three farms a disease of witch weed was noticed and it is possible that this may have a beneficial effect in controlling the pest. It was also reported as being present on other farms. There is evidence that the severity and extent of witch weed attacks have fluctuated periodically during the last 12 years, and this may be connected with the increase or decrease of the disease. The point merits further investigation.

5. Although underplanted crops of cowpeas and soya beans appeared to smother the witch weed to some extent, yet sufficient of the parasite struggled through even thick patches of the cover crops to cause a heavy infestation in succeeding years.

Extension Work.—Fewer farm visits by officers from headquarters were possible than in previous years. For three months Mr. McLoughlin, Assistant Agriculturist, was seconded to the Gwebi Farm, while the Chief Agriculturist was absent in the Union of South Africa for a month attending the Pan-African Agricultural Conference in Pretoria.

The three Agriculturists on the staff made 457 farm visits, and lectures or addresses were given at seventeen meetings of farmers. A good deal of attention was devoted to the sand veld demonstration station for the Enkeldoorn district, situated on the farm of Mr. P. O. Brocklehurst, Belvoir Spinney. Unfortunately owing to delay in commencing work on the plots which resulted in late planting of all the crops, together with the continuous rains of the early part of the season and the poorly drained nature of the land, the first season's results were extremely poor. Early planting is a prime essential on this class of soil.

The usual produce and educational exhibits made on all Agricultural Shows, entailing a considerable expenditure of time and money. It would appear that some Show Societies regard the Government exhibit merely as a means of obtaining a better display, and of filling up space in the produce hall. It is not possible to provide new and striking features in these exhibits each year, and they have now become such a commonplace that at the smaller shows very little interest is often shewn in them. The educational value of the Departmental produce exhibit is not what it was when many of the crops and products were unknown to farmers, and its discontinuance is a matter for consideration.

General.—A satisfactory feature is the fact that in spite of no little depression in the agricultural industry, farmers as a whole are evincing increasing interest in more up-to-date methods, including rotation of crops, the making and conserving of greater quantities of farm manure, the more liberal use of fertilisers, the provision of better supplies of winter feed for livestock and the more intelligent feeding of dairy and beef cattle. Progress in these directions cannot fail to effect a steady improvement in farming finances.

Wheat growers are learning the advantages of green manuring soils during the summer months, of applying phosphatic fertilisers to the grain crop and above all of not attempting to grow two long season crops, such as maize and wheat, on the same land each year. What is believed to have been the heaviest yield of wheat yet obtained in Southern Rhodesia, namely over 14 bags (or 46 bushels) per acre, was recently secured over a considerable area on a farm within a few miles of Salisbury.

Staff.—The retirement from the Service of Mr. J. A. T. Walters, B.A., late Agriculturist, on account of continued ill-health, is a cause of deep regret to all those who have been associated with him in the past. Mr. Walters joined this Department in 1912 and was subjected to severe strain when unaided during the period of the Great War, he carried on the work of this Branch of the Department in the absence of the writer on military duty. The best wishes of his many friends in the Service and amongst the agricultural and commercial communities, will accompany him in his retirement to a farming life.

Publications.—The following contributions were made to the Rhodesia Agricultural Journal, and a number of others to the local Press:—

By the Chief Agriculturist—
Fattening for Beef, Gwebi Farm.
Farmers' Days in Rhodesia.
Farming in Matabeleland.

By D. E. McLoughlin, (Assistant Agriculturist)—
Gwelo Demonstration Station. Annual Report, 1928-29.

By S. D. Timson, M.C., Dip. Agric., Assistant Agriculturist—
Bulawayo Demonstration Station. Annual Report, 1927-28.
Sunn Hemp.
The Sweet Potato Crop.
Maize on the Sand Veld.
Maize Undersown with Cowpeas.
Witch Weed; Methods of Control.

By C. W. Marshall, Horticulturist—
Fruit Growing in Rhodesia; The Home Orchard (in 2 parts).

By H. C. Arnold, Manager, Salisbury Experiment Station—
Salisbury Agricultural Experiment Station Annual Report, 1927-28 (in 4 parts).

By C. A. Kelsey Harvey, Manager, Tobacco Experiment Station—
Maize on the Sand Veld: Results at the Tobacco Experiment Station.

In conclusion I desire to place on record my appreciation of the good services rendered by all members of the Staff. Their keenness and devotion to duty has been all that could be desired.

H. G. MUNDY,
Chief Agriculturist.

Annexure " D."

REPORT OF THE CHIEF ENTOMOLOGIST
for the Year ending 31st December, 1929.

AGRICULTURAL.

1. **Cotton.**—An Entomologist has continued to devote attention to the pests of this crop, the insects studied including the Cotton Jassid **(Empoasca fascialis)** and Stainers **(Dysdercus,** spp.). Detailed reports dealing with these investigations were received in June.

Apparently definite primary injury to growing cotton plants by Termites was recorded early in the year.

As the result of the experimental poisoning of adult beetles of the so-called Wireworms **(Trachynotus**, sp. Fam. **Tenebrionidae)** at the Cotton Breeding Station, Gatooma, in May, 1928, the mortality of cotton plants from this cause was conspicuously decreased and the measure was not only repeated at the Cotton Breeding Station this year but was practised by a number of farmers in the district.

2. **Tobacco.**—Investigations have been prosecuted with a view to discovering an insect vector, if any, of the Tobacco Mosaic disease. Species experimented with included a Capsid, **Engytatus volucer,** Kirk., and the Aphid, **Myzus persicae,** Sulz. Negative results were obtained with both. The first named insect gave positive results, however, with a disease known as " Crinkle." The feeding habits of these species were studied closely and reports dealing with both insects in relation to tobacco were received in July.

3. **Maize.**—The effect of planting early maize as a trap for Maize Stalk Borer **(Glottula fusca,** Hmpsn.) was strikingly illustrated last season at the Agricultural Experiment Station, Salisbury, the trap crops being 100% infested and the main crops to a negligible extent.

Preliminary tests were made with a view to ascertaining the degree of injury from which a maize plant would recover. It was found that plants less than fourteen to fifteen inches high were only checked and not killed if cut back to the ground level, but that a large percentage of plants so treated after some six weeks of growth, i.e., of greater size, died. Owing to very late planted maize being used for these tests the effect on the final yield could not be ascertained. This work has a bearing chiefly in reference to outbreaks of the Army Worm **(Laphygma exempta,** Wlk.), a local outbreak of which occurred in the Hartley district in late December, 1928, and terminated early in January of the year under review.

Some practical operations in poisoning Snout Beetles **(Tanymecus** and **Systates)** were superintended in December. This measure is very effective in dry weather but liable to be interfered with by rain.

Emergence of the over-wintering brood of Maize Stalk Borer **(Glottula fusca,** Hmpsn.), was recorded in the insectary and found to cover the period from December 21st to 31st. There appears to be considerable irregularity in the dates of appearance of these moths and some indication that the tendency is for emergence to occur later, at least at Salisbury, than used to be the case. There is little doubt that this pest is increasing in destructiveness, presumably as the result of gradually becoming better adapted to subsisting on the maize crop as grown in the Colony.

4. **Potatoe.**—A virus disease resembling if not identical with **Streak Disease** was investigated and transmission apparently traced to a species of aphis infecting the young shoots in storage. Apparently the disease is only perpetuated through these shoots and not through the mature foliage.

5. **Root Gallworm (Heterodera radicicola).**—The bionomics of this important soil pest have received attention, the life cycle has been followed through and additional information obtained concerning its perpetuation in the field.

A series of experiments aimed at eliminating or greatly reducing infestation of a piece of land which bore infested tobacco plants last season at the Tobacco Experiment Station, Salisbury, has been inaugurated.

6. **Mussel Scale (Lepidosaphes beckii).**—On account of a suggestion that an attempt should be made to eradicate Mussel Scale **(Lepidosaphes beckii)** on Citrus in the comparatively limited infested area around Umtali, an investigation was carried out by an Entomologist in April. The investigation did not suggest that the suggested eradication campaign was readily feasible nor that the presence of the scale constituted any unusual menace. The scale does not appear to have spread to an appreciable extent during the last twenty years or more.

It is to be noted that owing to pressure of administrative duties and other work connected with the struggle against Tsetse Fly encroachment, agricultural and horticultural pests have not received the attention which their importance warrants.

7.—**Moth attacking Rhodesian Tobacco in London.**—The moth **Ephestia elutella** was reported in November as attacking Rhodesian tobacco stored in warehouses in London. With a view to securing data on the possibility of the infestation having been contracted in Rhodesia a thorough examination of stored tobacco in warehouses, barns, etc., in and around Salisbury was carried out with completely negative results. Finally I visited Beira during December and inspected the Transit Sheds and conditions around the wharves, finding no indications of any potential source of infestation. Tobacco in transit gave negative results as also did inspection of a tobacco and cigarette factory in the vicinity of the town.

I have pleasure in recording my appreciation of the courtesy of the Portuguese officials and officials of the Beira Works and Railways in connection with the inspection of conditions at the port.

MEDICAL AND VETERINARY.

TSETSE FLY.

The continued spread of Tsetse Fly **(Glossina morsitans)** is now recognised as constituting one of the major problems confronting the Colony. Menace to settlement has necessitated not only continuance and extension of operations in progress at the commencement of the year, but inauguration of operations elsewhere.

Following its convolutions the fly " front " extends for fully six hundred miles. Having regard to the comparatively limited resources of the young colony, the smallness of the European population and the fact that the native population, also comparatively small, is mainly concentrated in districts remote from the fly menace, the magnitude of the task of attempting to stem the tide is readily apparent.

Obviously, intensive and costly operations along the whole of the " front " are outside the limits of practicability. It is only here and there, over comparatively short sectors, where the fly is either causing losses to farmers, in some cases to the extent of preventing their keeping cattle at all, or by its steady advance, threatening occupied country, that the position justifies, and indeed demands, vigorous efforts to stop the advance and to drive back the fly to a sufficient extent to place the farms outside the danger zone.

These efforts, in default of other practical alternatives, have taken the form of endeavours to create and maintain approximately game free zones against the advancing fly and, with a view to driving back the pest, overlapping the limits of the fly infested country. The full effect of such operations is tardy in appearing but evidence is accumulating, indicating that the procedure, if persisted in, is likely to be fully effective in relieving the farms in the end. The delay in obtaining a complete " clean up " of the affected farms in the Lomagundi district is in all probability attributable to continued intrusion of odd flies, even though the limits of the tangible fly area have receded to a considerable distance. In this intrusion traffic from the fly area in the form of motor vehicles and native cyclists no doubt plays a prominent part, but unaided movements on the part of the flies themselves cannot be excluded as a possibility. The indications are that the width of country first fenced for game reduction purposes, namely ten miles, is hardly wide enough and the effect of the additional ten mile width fenced in Lomagundi is awaited with interest.

With experience and increased knowledge it may prove possible to accelerate the process of thrusting back the fly. One important fact at least appears deductable from experience to date, namely that vigorous and sustained operations

against game in defined zones correctly situated, have an early effect in arresting the advance of what may be termed the " main body " of the fly, although for a limited period they may have no effect on or may even serve to intensify the ranging of scattered individuals.

It is to be realised, however, that operations in limited sectors, however successful, constitute no final solution of the fly problem. The advancing fly tends constantly to outflank these areas and in any case relaxation of effort would in the normal cause of events be followed by renewed advance of the pest. This has occurred in the neighbourhood of the Gwaai and Shangani rivers where the fly, driven back by operations against game between the years 1919 and 1922, has, since the termination of these operations, once more encroached and is now definitely further west than was the case when the operations mentioned commenced.

Settlement of ground gained against the fly can only be possible in limited areas, owing to the nature of the country, and in any case the new settlers themselves would need protecting in their turn. There is, however, some suggestion of elasticity about game reduction and, with a definite objective in view, such as the elimination of certain salients, and utilisation of natural or partially artificial barriers, it may prove possible eventually to bring about permanent improvement in certain districts, which can be maintained at little cost.

Close and continued research is greatly needed to furnish knowledge which may be applicable to accelerating the process of retrogression resulting from present methods, to recognition of natural and creation of artificial barriers, and possibly to development of new, less objectionable and more speedily effective methods of control. It is hoped that adequate provision will be made for such research at a reasonable early date.

In the meantime efforts to relieve and protect the settlers by any practicable measures affording a prospect of success are apparently unavoidable.

1. **Operations in the Lomagundi District.**—These operations, commenced in January, 1926, have been prosecuted throughout the year both in the originally fenced area and in the extension of similar width on the northern side, that is to say over a zone twenty miles wide adjacent to the occupied area. The game fences have been kept in repair and records of breakages kept. The fences have been broken in several places every month, but as their total length is somewhere near one hundred and twenty miles, it is clear that the number of breakages is insignificant compared with normal movements of game.

Close inspection of the older area by a European with bait oxen and six natives, extending over a period of about six weeks failed to reveal any tsetse flies, except at one point immediately adjacent to the former northern fence. In the occupied area south of the fenced zone several odd tsetse flies were taken in the course of several months, two by special inspectors, one by a farmer and one by a native. All of these were close to traffic routes from the fly area, and all except one, close to a route much used by native cyclists and motor vehicles.

Whilst the general improvement in the position in regard to the health of cattle in the occupied area has been maintained on the whole, several farms have been affected, and complete eradication of the disease from the occupied area has not yet been achieved. The incidence of the disease during the year has been notably erratic. Of the five farms still occupied and originally known to have been effected south of the fenced zone between the Hunyani and Angwa rivers, two farms only have sustained outbreaks, one of them after a period of immunity of some eighteen months. The farm mentioned in my last annual report as having shown no definite improvement has on the other hand apparently been free from infection during the year. Unfortunately a farm more remote from the fly area and not known to have been affected previously, has sustained an outbreak and two tsetse flies have been caught within its boundaries. The possibility of this farm having been affected in previous years is, however, not excluded.

On the east side of the Hunyani River all farms previously affected have remained free with the exception of the northern most and nearest to the fly area, where an outbreak occurred early in the year. No new farms have been affected in this section.

It has been possible to follow progress in the newly fenced area in some detail. Definite operations against the game in this area commenced in June last year, but some disturbance had been in operation in the previous year owing to the necessity of supplying natives employed on Tsetse Fly investigations with meat.

The investigations referred to had supplied data concerning the density and breeding activity of the fly in a portion of the area and figures bearing on density had been collected, on a less systematic plan, over the whole of the new area. Similar investigations have been carried on during the past dry season and similar general observations have been made throughout the area.

The details of the final report need not be anticipated here but throughout the new area a very great reduction in adult density is apparent. This reduction is in fact conspicuous to all who have had experience of the area in previous years. Control observations in the undisturbed area outside and north of the fence reveal no such reduction in density and the contrast is very striking.

It has been found possible to collect comparable data concerning the numbers of puparia to be found inside and outside the area, but puparia have been collected in considerable numbers inside the area within a distance of two to three miles of the boundary game fence. It is judged, however, that this is not beyond the free range of well-fed flies from outside. In any case puparia have been considerably more numerous outside the area.

Examination of the gut contents of flies inside the area has revealed an insignificant increase in the percentage of avian (bird) blood, but mammalian blood has remained overwhelmingly predominant.

Other details, including infection of the flies with various species of Trypanosomes, etc., are reserved for a more detailed report later.

The complementary operations on the eastern side in the Sipolilo sub-district under the direction of the Assistant Native Commissioner, Sipolilo, have been continued throughout the year and that official reports that there have been no deaths from Trypanosomiasis amongst native owned cattle during the year, that game is diminishing and also tsetse fly. The number of animals destroyed is about three-quarters of the number destroyed last year. With reference to the absence of losses from Trypanosomiasis in this region it may be stated that, although cattle have been withdrawn from the more forward positions, herds have been running without loss at several native kraals where considerable losses were sustained a few years ago. An inspection of the portion of this area near the Hunyani River failed to reveal the presence of fly except close to the extension of the present northern fence into this district. Although we have not been able to follow the effect of these operations in detail all indications point to an improving position.

2. **Operations in Gatooma Sub-district.**—During the year the eastern game fence has been extended as far south as the Umsweswe River. This was completed in March.

Operations against game have been prosecuted vigorously throughout the year and the game fences have been kept in good repair. The number of native hunters has been increased to forty with three European overseers.

This area, on account of the uniform and comparatively dense nature of the forest, the large extents of semi-thicket affording cover to game and the scanty supply of permanent water is a more difficult proposition in regard to game elimination than the Lomagundi area. The abundance of warthog, an animal which appears to be in a large degree independent of surface water, is a great complicating factor. These animals are more abundant than any other species in the area and invariably head the monthly list of animals destroyed.

Whilst there is no indication of fly having established itself anywhere on the east side of the fenced zone there appears to have been a limited extension southward between the fences since 1928. The farmers have reaped no obvious benefit as yet from the operations beyond the apparent staying of the encroachment of the definite fly area which had previously been extending eastwards very rapidly. In actual fact a number of fresh farms have sustained losses during the year and the position has been very unsatisfactory. A transition period of this nature has, however, occurred in all instances to date where intensive hunting of game, and, it should be noted, intensive deforestation in one case of a fly area close to settlement has taken place. Wider ranging of the fly for a period is probably the natural sequel to any fundamental interference with environmental conditions in a fly area. The fact that the country adjacent to and slightly overlapping occupation in this area was much more heavily infested with fly at the commencement of operations than areas where measures of the same nature have been adopted previously must obviously tend to make the position worse and possibly to delay later improvements in respect of the health of cattle on the farms.

Whilst investigations bearing on the density of the fly in the fenced zone indicate some improvement this is not sufficient to be decisive and does not compare with the reduction in density in the new zone in Lomagundi. This is no doubt largely attributable to the more difficult nature of the country as emphasised above.

An Entomologist was stationed for two months in this area during the latter part of the dry season with a view to ascertaining, in reference to the continued occurrence of fly in some numbers, whether the insect was breeding freely in the area or otherwise. Complementary observations were made outside and west of the fenced area. In spite of the presence of adults, breeding, at least in the area closely worked, proved to be at a very low ebb, whilst outside and west of the area living puparia were collected readily in large numbers by the same collectors. It is only possible to presume that large movements of flies, generated outside the area, have been taking place through a considerable portion of the fenced area and it may be said that great and rapid fluctuations in fly density recorded in the fenced area appear to support this view.

The view that a ten mile zone is scarcely wide enough for the purpose in view presumes fly movements on a considerable scale and there is much tending to justify this presumption.

On account of the spreading fly having outflanked the fenced area on the northern side through the Magondi Native Reserve it was decided towards the end of the year to erect a flanking fence and to extend operations into a fresh area adjacent to the Umfuli River and east of the present fenced area.

3. **Wankie District.**—Administrative duties connected with the endeavour to settle the farms along the Gwaai River with a hunting class of settler have not been allocated to this branch.

Special inspection of the area between the railway line and the Gwaai River extending over several months revealed the fact that fly is becoming established on the western bank of the Gwaai River below the Dett Junction, at least as far down as the Gwaai-Shangani junction but none could be found away from the vicinity of the Gwaai River. The position is thus worse than it was in 1919.

4. **Sabi River Valley and Melsetter—Portuguese Border.**—An Inspector has spent the whole year in the Melsetter district and neighbouring country investigating the question of distribution of Tsetse Fly. A prolonged inspection of the Sabi River Valley with bait donkeys as far as and beyond the border give entirely negative results. Fly has been searched for in various localities where cattle were reported to have contracted Trypanosomiasis recently, also with negative results. A specimen of what appears to be an aberrant form of **Glossina pallidipes** was, however, taken by the Cattle Inspector, Chipinga, within Rhodesian territory in March. This is the first authentic record of a tsetse fly taken in this Trypanosomiasis affected district at least since 1896.

Inspection of Portuguese territory near the Melsetter border failed to reveal the presence of tsetse fly south of Spungabera but **pallidipes** and **brevipalpis** were met with abundance on the Spungabera-Gogoyo footpath. By comparative observations definite indication was obtained of an advance of the fly towards the border in the wet season. In late November the fly was met with in numbers some six miles nearer the border than in May.

Collection of large numbers of tsetse flies from near Spungabera to Gogoyo has not furnished any more specimens of **Glossina morsitans** (see last year's report) and the specimen of this species stated to have been taken on a buffalo near Spungabera last year must apparently have been a straggler, probably from east of the Sitatonga Hills.

5. **Co-operation of Native Department in Measures against Tsetse Fly.**—The measures undertaken by the Agricultural Department have been mainly directed towards the protection of European settlement and apart from other considerations it has seemed only just that the natives should be given the opportunity of endeavouring to protect their reserves, and other country occupied by them, from the encroaching fly. A conference of Native Commissioners from fly infested and fly threatened districts was accordingly held in Salisbury in April and was attended by representatives of the Entomological Branch, including myself. It was recommended to the Government that a cordon of game reduction areas, including the areas of intensive operations under the Agricultural

Department, be maintained along the whole limit of the fly country and that a number of natives in this zone be armed and permitted to hunt under the direction of the Native Commissioners. This recommendation has been given effect.

It is realised that such hunting is not likely to be effective everywhere but, in view of experience suggesting that arrest of the advance of tsetse fly is much more readily brought about than actual retrogression, it is thought that the measure may at least tend to retard the spread of the pest. The position is far too serious for any sentimental considerations to be taken into account.

6. **Ecological Studies.**—During the year further attention has been devoted to study of the forest vegetation in reference to the past distribution of Tsetse Fly as recorded in the Colony. There appear to be grounds for anticipating that the composition of the natural forest can be utilised to furnish a key to the limits of the potential fly country as imposed by climatic conditions. Seeing that there are certain islands of elevated ground within the recorded former fly limits and that available information as to these limits is not altogether complete, the investigation appears likely to furnish information susceptible of practical application. Unfortunately, administrative duties have prevented visits to important parts of the Colony for the purpose of making observations and it has not been possible to make as much progress as was anticipated early in the year.

7. **Control of Traffic from Fly Areas.**—With a view to securing the necessary powers for the control of traffic from fly areas a Bill, drafted by this branch, was introduced into and passed by the Legislative Assembly in May, 1929. Preparations for enforcing the new Act were commenced immediately, but a number of unforeseen difficulties were encountered and for reasons outside the control of this branch the regulations had not been given effect to by the end of the year. Little further delay is, however, anticipated.

This is an important measure in reference to Tsetse Fly control, but satisfactory arrangements are exceedingly difficult, and even effective treatment of motor vehicles, without having recourse to the use of deadly poison, constitutes by no means a simple problem. It is, however, anticipated that the attendant difficulties can be to a large extent overcome.

8. **Visit to Zululand.**—Advantage was taken of the opportunity afforded by my attendance at the Pan African Agricultural and Veterinary Conference at Pretoria to pay a visit to the Tsetse Fly areas in Zululand during late August and early September. I spent ten days with Mr. R. H. Harris who is in charge of Tsetse Fly work in Zululand and visited the Umfolozi and Hluhluwe Game Reserves as well as the settlements affected by Trypanosomiasis. This visit was very informative. The fact that in both Southern Rhodesia and Zululand the most acute aspect of the Tsetse Fly problem lies in the effect on European settlement would appear to suggest considerable similarity of conditions, but in actual fact the different species and habits of the Tsetse Flies involved and the markedly dissimilar nature of the forest and country generally made it clear that a solution of the problem in one country might well fail to apply to the other.

I take this opportunity of expressing my appreciation of the courtesy of Mr. Harris and his staff and of the facilities afforded me during this visit of seeing a considerable portion of the fly infested country.

Bionomics of Muscoid Flies.—An Entomologist has devoted a considerable portion of his time to studying the bionomics of the common species of **Muscoid** flies breeding in dung, carrion, refuse, etc. These flies are allied to **Glossina** (Tsetse) and a study of their parasites has been in progress since the beginning of last year. It has not been demonstrated that the major parasites of **Glossina** attack the allied forms in nature and a line of enquiry judged, promising in its inception, has yielded negative results to this extent. At the same time a useful contribution to entomological knowledge has emerged.

PRESERVATION OF THE NATURAL FAUNA OF THE COLONY.

Wankie Game Reserve.—This reserve has been maintained throughout the year and effective protection of the game has apparently been achieved. It is not possible, on account of the great extent of the reserve, nearly 6,000 square miles, to give any estimate of the numbers of the different species of animals present.

Large numbers of elephant, buffalo, giraffe, eland, kudu, roan, sable, oryx, tsessabe, impala, zebra, warthog and smaller animals; are present, whilst Carnivora are very abundant. The latter are not preserved, as in the case of some other African game reserves, but are regarded as vermin, and one of the duties of the Warden is their destruction. It is considered that it would be an act of injustice to stock owners in the district if these destructive animals were to be allowed to increase under protection in the game reserve, where in point of fact they have been sufficiently numerous without protection to levey a heavy toll on neighbouring stock owners in the past. Water supplies in the reserve have been considerably better than in the previous dry season of 1928, and this has been reflected in the comparatively weak tendency of the elephant to cross the railway line with the objective of the perennial water supplies in the Dett and Sikume rivers. In view of the fact that the country between the railway line and the Gwaai river is an open area for shooting, on account of the danger of tsetse fly encroachment, the Warden was instructed to take steps to prevent elephant crossing into the area as far as possible, and if herds crossed to endeavour to drive them back again. His efforts in this connection were to a large extent successful, although one or two animals were regretably wounded, apparently not mortally, in self-defence. No reports have been received of any elephant having been destroyed by hunters in the "open" area.

Augmentation of the permanent water supplies in the reserve is a matter which deserves serious consideration, but otherwise the area is certainly very suitable for the purpose of preservation of the species which frequent it.

Carnivora destroyed by the Warden during the year amount to:—18 lions, 4 wild dogs, 4 leopards, 23 hyaenas.

Game and Fish Preservation Act, 1929.—Although the duty of drafting the above consolidating measure did not fall to this branch, a considerable amount of the preliminary work did and as a result a number of necessary additions and modifications were finally embodied in the Act.

Pan African Agricultural and Veterinary Conference, Pretoria.—During August I attended the Pan African Agricultural and Veterinary Conference as one of the Southern Rhodesian delegates. The meetings of the Agricultural Section of the British Association were also attended.

Nurseries Ordinance, 1909.—Of twenty nurseries registered eighteen were inspected during the season.

Importation of Plants Regulation Ordinance, 1904.—The following consignments have been dealt with by the Plant Inspectors at the various ports of entry:

Salisbury	2,159
Bulawayo	7,509
Umtali	331
Gwelo	498
Total	10,497

One hundred and twenty-seven Special Permits for the introduction of plants, etc., into the Colony were issued during the year.

Annual Permits issued to nurseries in the South African Union totalled seventy-two.

Regulations in other Countries affecting Export of Plants from Southern Rhodesia.—Ten certificates of cleanliness have been issued in respect to plants intended for export to other countries.

Agricultural Shows.—The Entomological Exhibit was placed on the benches at the Agricultural Show at Salisbury with an officer of the branch in attendance.

Farms Visited.—Farms visited by the staff during the year totalled seventy-nine.

Staff.—Mr. J. I. Roberts, Entomologist, proceeded on long leave on the 29th July and resigned during October.

The technical staff during the second half of the year has thus been limited to two Entomologists, one of whom was continually away in the Lomagundi district until the end of November and the other during the months of October and November in the Gatooma sub-district.

The European field staff has consisted of two Rangers throughout the year, stationed in the Lomagundi and Gatooma areas respectively, two Assistant Rangers during the latter part of the year in the Gatooma area, two Tsetse Fly Inspectors employed throughout the year and three Tsetse Fly Inspectors employed during a varying number of months each. The Game Warden, Wankie Game Reserve, has been employed throughout the year.

I have much pleasure in testifying to the energy and local co-operation of all members of the permanent staff during the year and would extend this statement to include the great majority of the field officers.

RUPERT W. JACK,

Chief Entomologist.

Annexure " E."

REPORT OF THE COTTON SPECIALIST, EMPIRE GROWING CORPORATION, For the Year 1929.

Apart from the work carried out on the Cotton Breeding Station at Gatooma, efforts have been concentrated on the bulking up of U. 4 cotton seed in order to meet the demand, which it was anticipated would come from farmers all over the country for planting in the Spring of this year. The scheme adopted was outlined in the report for 1928 where it was stated, " If farmers will hand plant in order to economise seed for the ensuing first year of general cultivation of U. 4, it should be possible to attain a total area of 10,000 acres." At the same time it was added that, " Provided there are no severe and unforeseen attacks of bollworm, and a fair average season is experienced the acreage indicated above might be trebled."

The behaviour of the U. 4 cotton crop has more than justified the first statement, while the vagaries of the season have prevented the latter from being achieved. The seed issued to date (December, 1929) is just sufficient to plant slightly over 10,000 acres.

The season did not turn out to be a favourable one for cotton, which fact has given greater confidence in U.4 than would have been the case had it been grown in a year better suited to the crop. It is the firm conviction of those engaged in establishing the cotton industry, that, in a favourable season, U. 4 cotton will do very well in many districts of Southern Rhodesia. What is not yet known, nor likely to be for a number of years, is the incidence of such seasons. We now know, however, that even in a distinctly trying season, such as has been experienced, that U. 4 cotton will do fairly to moderately well.

This opportunity is taken of acknowledging, with gratitude, the services rendered to the cotton industry, and to the country by the many farmers who undertook to plant seed increase plots. Their joint action has been responsible for increasing the seed supply from approximately one ton to 66, or sufficient to plant over 13,000 acres. By far the majority took a considerable amount of trouble in seeing that their lands were well prepared and kept clean throughout the season. That several did not do so was due, in most cases, to circumstances over which they had little, if any, control. That there were a number so placed is only mentioned as it is necessary to take into account the treatment which the crop received when estimating the percentage of failures and successes.

It would obviously be unfair to classify any crop as a failure if it suffered from lack of attention.

In estimating results of this nature it is sometimes difficult to draw a sharp dividing line between successes and failures. The very meagre seed-rate which has to be employed necessitates the greatest of care in planting. Even where such care has been exercised it happened, in some cases, that climatic conditions prevented a good germination. Under ordinary commercial conditions this would not have happened owing to the heavier seed-rate which would have been employed.

There were cases where the stands of cotton were poor, but the individual plants yielded well. Such cases can scarcely be considered failures on account of their low acre yields.

Taking into account the appearance of the cotton farms, combined with the amount of seed cotton sent in to be ginned, the writer is of the opinion that the crop was successful to the extent of about 80 per cent.

While this figure does not reflect a complete and unqualified success, it may be urged that it is at least high for any annual crop. It is a very decided swing of the pendulum in favour of cotton growing when one considers that previous attempts, with the exception of one year, were almost complete failures.

It should be carefully noted, however, that this year's results were obtained by selected farmers, the majority of whom are operating in three districts, namely Hartley, Lomagundi, and Mazoe. Whether similar results will be obtained on a wider scale remains to be seen. Much depends on the ensuing season. If it should happen to be a favourable one there is a danger that some farmers may consider it a suitable crop to be grown on an extended area, whereas it may only be suited to their particular locality in favourable years.

Against this, it should be pointed out that the seed now issued is only the first attempt with a strain of seed which shows signs of very considerable improvement, both in regard to yielding quality, and resistance to Jassid.

SPECIALLY SELECTED SEED.

In order to improve the quality of the general seed supply, next year, a scheme has been evolved whereby it is hoped that this desirable object may be achieved.

Plants, which were specially selected for yielding qualities a year ago, were bulked up carefully on the Cotton Breeding Station, and issued in 10lb. packets. For these the price was fixed at £1 per packet, which appears to be very high. The object in making such a charge, however, was to ensure that the seed would receive the treatment which it merits. It may be mentioned in passing that even, at this figure, it is not a commercial proposition, as the overhead cost of producing such seed is greater than the revenue likely to be derived from selling to the limited number of growers in such a young country as Southern Rhodesia.

When the scheme was launched, it was not known what reception it would get from the farming public. How far it has succeeded can be judged from the fact that the demand far exceeded the supply. So much so, that the packets had to be balloted for. In this connection the writer desires to acknowledge the assistance of the Secretary of the Rhodesia Agricultural Union, Mr. Lionel Noaks, who kindly undertook the drawing of the names in the ballot.

The ready response of farmers to this method of improving seed stocks augurs well for the future of the cotton growing industry, as improved strains are already in existence at Gatooma, which should be available for issue, as indicated, each year from now onwards.

It is estimated that the seed multiplied up carefully from one of the special packets should give sufficient to plant fully one hundred acres the following year. As one hundred and twenty-four packets were issued this season it may be safe to assume that sufficient seed of this first, improved strain, will be available next season to plant upwards of ten thousand acres, while sufficient seed of the ordinary U.4. should be available to plant two hundred thousand acres, an area which, it is not anticipated will be planted for a number of years. This figure is only mentioned to emphasise the amount of seed which will be available, both for planting and cattle feeding purposes.

THE COTTON BREEDING STATION, GATOOMA.

Climatic conditions, together with a severe attack of American Bollworm, combined to make a very trying season for the work which was carried out on the Cotton Breeding Station.

Fertiliser and spacing trials were rendered valueless, and the supply of specially selected seed for issue to farmers considerably reduced. Nevertheless the Report of the Senior Plant Breeder, Mr. J. E. Peat, makes encouraging reading. He points out that " important results have been obtained. The promise of last year's U.4. selections is being maintained. Some good material is showing up, promising to yield well, high in ginning percentage, and good in staple length."

It is unfortunate when an organisation such as the Cotton Breeding Station receives severe set backs of the nature experienced this year, but it serves as a reminder, if a somewhat severe one, of the difficulties which may beset the average farmer in any unfavourable year. In this particular case it has emphasised, in no uncertain manner, the necessity of concentrating on the production of early maturing, and heavy yielding strains. It is gratifying to record the existence of such strains, and that they yielded moderately well despite the severity of the bollworm attack.

Had similar conditions prevailed the previous year it is unlikely that the seed supply to-day would be on so satisfactory a footing.

STAFF.

Mr. Peat returned from leave in March.

Mr. McKinstry proceeded on a year's study leave in September.

Mr. A. N. Prentice joined the Gatooma Staff of the Empire Cotton Growing Corporation in October.

The Government have appointed Mr. Alan Rattray as Foreman, and Mr. James Trinder as Plant Observer.

BUILDINGS.

One brick built guest room, with thatched roof, was built during the season, and work commenced on the erection of a brick and iron roofed shed in which to carry out ginning operations.

The remainder of the buildings are all constructed of Kimberley bricks, and have served the time, and purpose, for which they were originally intended.

A scheme has been submitted for the construction of a brick built bungalow, and an implement shed to be erected during the next financial year. If these are approved they will help to relieve the existing state of congested accommodation which, however, it is anticipated will require to be further augmented as time goes on.

FUTURE OUTLOOK FOR THE COTTON GROWING INDUSTRY IN SOUTHERN RHODESIA.

While it would be injudicious for the writer, or any one else, to make an attempt at prophesying what the future of cotton will be in Southern Rhodesia, it may not be out of place to consider its possibilities as a crop.

In 1924-25, over 60,000 acres of cotton were planted, but subsequent experience has shown that so large an acreage was not justified. In the same year 239,032 acres of maize were planted. The proportion of cotton to maize was, therefore, about 1 to 4.

This figure is quoted merely to show what the farmers were able to plant at that time. The area they would be prepared to plant now, providing they find cotton growing a payable proposition, and using the above ratio, should therefore be in the vicinity of 75,000 acres.

The fact that sufficient seed has been purchased to plant 10,000 acres, although more was available, goes to show that farmers are now entering upon cotton growing with commendable caution. This is all to the good, and those interested in the furtherance of the crop would not have it otherwise. Should the 10,000 acres, now planted, give a payable return, we may confidently expect a larger increase in the acreage next year, though it may take another two years before the acreage planted in 1925 will be reached. Again, this is all to the good, as it will take about two more years to get further improved seed into general use. When this takes place it is felt that cotton will become a much more reliable crop than it has been in the past, irrespective of climatic conditions. Much will depend on the attitude of the maize growers. At present, they only look upon cotton as a rotation crop for maize. Should they find that it consistently pays them as well, or better, than maize, there is the possibility of their increasing the ratio of cotton to maize from 1 :4 to 1 :3 or even 1 :1. While it is better not to anticipate so rapid an increase in cotton growing it is as well to realise that such may happen.

The writer has been informed repeatedly that there is a tendency on some of the older farms towards a decrease in the acre yields of maize, and this seems to be corroborated, if one takes into consideration the history of maize growing in the Mazoe Valley, over the last two years. The fear of witchweed, which over-shadows the maize growing industry, may become a potent factor in stimulating the growing of cotton. On the other hand, the depredations of the

various bollworms, have to be considered. Until last year, their effect on the cotton crop appeared to be almost negligible, although it is not safe to make definite statements in this connection as the majority of cotton crops did not carry a sufficient number of bolls to permit estimates of bollworm attack being made.

That several cotton crops were severely attacked last season, may have been due to the lateness of the crop in general. Only very meagre information exists as to the incidence of bollworms from year to year, and some considerable time will have to elapse before much can be learned in this connection.

A point which has not been taken into consideration in the foregoing, is the possibility of the extension of cotton growing into districts of which, as yet, little is known. There are a number of areas in Southern Rhodesia in which cotton growing may yet develop into a considerable industry. Attention in the past has been devoted mostly to the Hartley, Lomagundi and Mazoe districts, not so much on account of their suitability, as to the fact that the farmers in these districts have evinced a keener interest in the crop. Whether the industry will take root and flourish, in districts yet untapped, remains to be seen. There are still many obstacles to overcome, but these, to the writer at least, do not appear to be unsurmountable, and there is every reason to look forward to the future with confidence.

G. S. CAMERON,

Cotton Specialist,

Empire Cotton Growing Corporation.

Annexure " F."

REPORT OF THE BRANCH OF CHEMISTRY

for the Year ending 31st December, 1929.

General.—As in the past the major activities of the Chemistry Division have been confined to the accomplishment of the routine analytical work coming within the sphere of the agricultural chemist.

The carrying out of chemical analyses, although occupying the major portion of the time of the Division, constitutes by no means its sole or most important activity. Advisory work both by correspondence and interview forms an important part of the duties of the Division and assistance in this connection is rendered not only to farmers but also to commercial firms and other Departments of the Government.

Advisory work in connection with soils and their manurial treatment naturally forms the chief advisory work of the Division, but the range of problems on which advice is requested covers a wide field and frequently extends beyond the ordinary recognised sphere of the agricultural chemist.

The routine work under the present organisation that the Division is called upon to undertake consists of the following :—

1. Analyses of soils, waters, manures and farm foods sent in by farmers.
2. Analyses of samples taken under the Ordinance governing the sale of fertilisers and farm foods.
3. Cattle dip and toxicological analyses for the Veterinary Department.
4. Standardisation of glassware under the Dairy Produce Act, 1928.
5. Advisory work by correspondence and interview.

Summary of Routine Analyses.—A list of the routine samples received and analysed during the year is presented in the following table :—

Soils and sub-soils	578
Manures and fertilisers	32
Farm foods	17
Cattle dipping fluids	43
Toxicological	101
Vegetable products	65
Waters	19
Limestones and rocks	20
Miscellaneous	36
Glassware (standardised)	26
	937

Soils.—During the year under review the demand by farmers in Mashonaland for analyses of their soils and advice as to manurial treatment has been particularly heavy and the number of samples submitted is almost as great as in the " boom " tobacco year of 1926-27. It is interesting to note that, whereas in previous years soils were submitted mostly by new settlers who were anxious to obtain information regarding the suitability of their soils for tobacco growing, the soil samples during the present year have been submitted mostly by older established farmers who desired information as to the most suitable and economic methods of fertilising their lands for maize and other general crops. This is an important development and shows that farmers generally are taking a far greater interest in scientific methods of griculture and soil treatment than they did in the past. There is no doubt that the propaganda work carried out by the Maize Association in connection with the " Maize Competition " has done much to help in this direction. Many farmers entering this competition probably used artificial fertilisers for the first time on their maize lands, and saw for themselves the benefits that might be derived by the outlay of a sum of money on fertilisers.

This fact has undoubtedly led them to pay more attention to soil treatment and to realise that it is possible by following modern principles of agriculture to increase considerably the productive capacity of their lands.

It is rather striking that of the total number of routine samples submitted only 56 have come from Matabeleland and 89 from the Midlands. Included among the samples from the Midlands are 21 soil samples taken and analysed in connection with a soil reconnaissance carried out under instructions on behalf of Colonel B. C. Bartley, East Clare Estate, Que Que, which work occupied the whole time of one of the staff for a period of four weeks. Comparatively speaking, very few requests for advice or assistance are received from Matabeleland farmers, and when advice is requested it is usually in connection with problems in animal husbandry.

It is of interest that since the publication of the results obtained from the preliminary experiments carried out in Salisbury in connection with pasture improvement, several letters have been received from Matabeleland farmers relating to the feeding value of our veld grasses. It appears probable that the work of this Division on pasture problems will make a greater appeal to Matabeleland farmers than our efforts in other directions.

Manures and Fertilisers.—Altogether 32 samples were analysed under this head, of which 15 were sampled under the "Fertilisers, Farm Foods, Seeds and Pests Remedies Ordinance." Of these 15 samples, three were found to be outside the limits of error allowed under the Ordinance.

The importance to the farming community of the control of the sale of fertilisers is clearly emphasised by a study of the figures given in the Report on the Summer Crop Returns for the season 1927-28 showing the value of fertilisers imported during the last five years. From this report it will be seen that the value of fertilisers imported has risen from £26,472 in 1924 to £146,702 in 1927, dropping again to £98,657 in 1928.

The fall in 1928 was occasioned not so much, as it is generally believed, by the decrease in the use of fertilisers, but rather by the use of cheaper fertilisers in place of the much more expensive complete tobacco fertilisers. From the information available it appears that the sale of fertilisers from the three principal local firms for 1929 will amount to at least £148,000.

The annual expenditure by farmers in the purchase of fertilisers is, therefore, rapidly increasing, and it is essential that vendors should realise that the materials sold by them must conform to the guaranteed composition. While up to the present no proceedings against any fertiliser firms have been instituted, several warnings having been issued to those whose products on analysis have been found to be outside the limits of error allowed in the Ordinance governing the sale of these products. Several instances have occurred where fertilisers and farm foods have been offered for sale without having been registered with the Department as required under the Ordinance.

The registration of fertilisers with the Department of Agriculture affords a measure of protection both to farmers and merchants, and it is important that the regulations in this connection should be rigidly enforced.

Complaints were received during the year from two of the principal fertiliser firms carrying on business in the Colony that certain firms outside of the Colony were selling fertilisers that had not been registered. Investigation of the facts showed that this was correct and the firms concerned were notified that they were contravening the regulations. I am of the opinion that the time has arrived when breaches of the regulations in connection with the sale of fertilisers and farm foods should be more seriously dealt with.

Farm Foods.—Seventeen farm foods were analysed during the year, of which four were taken under the "Fertilisers, Farm Foods, Seeds and Pest Remedies Ordinance." In one instance the material was found to be considerably below its guaranteed standard.

Cattle Dips.—Nearly all the samples analysed under this head were submitted by the Veterinary Department for analysis under the "Cattle Cleansing Act. 1927."

Standardisation of Glassware.—Two pipettes and twenty-four Babcock cream test bottles were submitted for standardisation as required under Government Notice No. 279.

Two pipettes were passed, but not one of the cream test bottles conformed to the standard laid down in the above Notice.

Toxicological Analyses.—The majority of the 101 samples analysed under this head consisted of the viscera of cattle suspected to have died from arsenical poisoning.

In several cases where arsenic was found to be present in the stomach contents of the dead animal, the source of the arsenic was difficult to find. but was eventually traced to the animals eating soil on the farm over which cattle dip had been spilt.

The losses among cattle from this source have been very heavy on several farms in the Colony, and in spite of warnings issued in the Rhodesia Agricultural Journal there appear to be many farmers who do not seem to realise the potency of the arsenical dips they are using and the monetary loss that may ensue from the careless handling of this poison.

In addition to cases of poisoning by arsenic, three instances were found of poisoning by nitrate of soda and one by cyanide.

Vegetable Products.—Classified under this head are samples of tobaccos, grasses, sunflower leaves and lemons.

The lemons were analysed to determine their citric acid content at the request of the London Office. A number of tobaccos were analysed to determine (1) the influence of proctorising on the essential oil content and (2) to obtain a comparison between the organic and inorganic constituents of American and Rhodesia tobaccos. (3) At the request of the Entomological Division analyses were carried out to determine the influence of various fertilisers applied to the seed beds on the composition of the young tobacco plants.

Waters.—Nineteen samples were analysed during the year and reports given as to their suitability for agricultural purposes.

Limestones and Rocks.—The samples analysed under this head were mostly rocks and deposits submitted by farmers who believed them to be limestones and of value for agricultural purposes.

Miscellaneous.—Included under this heading are salt licks sent in by the Game Warden at Wankie; telephone cables submitted by the Chief Engineer of the Post Office; and deposits occurring in gas engines.

Investigational Work.—The whole time of the existing staff has been occupied in coping with the large amount of routine work which the Division has been called upon to accomplish, and while no new problems have been investigated every effort has been made to continue the experiments previously in progress. Although an additional chemist was appointed at the beginning of the year, the benefit that might have been derived from this appointment has been largely discounted by the increase in the amount of routine work and the absence on leave for five months of another member of the staff.

The following are the experiments at present in progress:—

1. **Citrus Fertiliser Trials.**—In 1923 experimental groves were laid down in collaboration with the British South Africa Company on their Estates at Mazoe and Umtali, with the object of determining the influence of various combinations of inorganic fertilisers on the yield and health of the trees and the texture and quality of the fruit. The results so far obtained are rather difficult of interpretation, although a marked difference in the health of the fertilised trees against the unfertilised is apparent.

It is almost certain that the effects of the fertiliser treatment are to a great extent being masked by the beneficial influence on the trees exercised by the green manuring treatment accorded annually to all the groves on these estates. It is possible that in the course of time the influence of the artificial fertiliser treatment will become more marked and the experiments are therefore being continued.

2. **Manuring for Maize Production.**—In 1926 a series of plots were laid down at the Salisbury Experiment Station with the object of comparing the relative values of raw rock phosphate and the standard bone-and-superphosphate mixture as fertilisers for maize. The results of this experiment were published in the December number of the Rhodesia Agricultural Journal and the information so far obtained is of both academic interest and economic importance.

The experiment is being continued.

3. **Asbestos Waste as an Ameliorant for Soil Acidity.**—In October, 1927, an experiment was laid down at the Government Farm, Gwebi, to test the statement which appeared in certain agricultural and chemical journals that asbestos waste was believed to exercise a beneficial influence on acid soils by lowering the acidity.

One ton of asbestos was supplied gratis by the Rhodesian and General Asbestos Corporation, Ltd., and was applied to plots at the rate of one ton per acre. The plots were cultivated and cropped as on the rest of the farm and the acidity of the soil was periodically determined electrometrically. The application of the asbestos waste apparently exercised no influence on the acidity of the soil, neither was there any noticeable difference between the crops growing on the treated plots and those on the control plots.

It is, therefore, concluded that under conditions prevailing in this Colony asbestos waste has no value as a soil ameliorant, and the experiment is being discontinued.

4. **Research into the Improvement of Natural Pastures.**—Preliminary experiments carried out during the past two years at the Salisbury Experiment Station have given interesting results and have shown that by fertilisation of the ordinary veld, it is possible materially to increase the yield of grass and at the same time to alter the mineral composition of the grass.

It has also been shown that shortly after the conclusion of the rains there is a rapid fall in both the protein and mineral composition of the grass on the veld. It is highly probable that this low mineral content, combined with the low protein and high fibre content of the grass, is the cause of the inhibition in the rate of growth which is apparent in young grade animals grazing on the veld during the winter months, and it is little wonder that there are many deaths from so-called " poverty " among grade cattle and working oxen, even though the quantity factor of the grazing on the veld appears ample. This finding shows that even on the poorest of our veld pastures the cutting of the grass for hay at the correct season of the year results in a product having a very much higher feeding value than the grass left standing on the veld. Were farmers to adopt this practice, it would probably mean that their losses of stock from " poverty " would be reduced considerably, and that in many cases grass having a minus feeding value when left standing would be converted into hay with a feeding value at least sufficient to supply maintenance.

Further, much more extensive experiments have now been commenced on a portion of the Government farm at Matopos. The expenditure in connection with these experiments is being met on the £ to £ principle by the Empire Marketing Board. Owing to numerous delays in the choosing of a satisfactory site for this work and the large amount of preliminary work necessary the whole scheme anticipated cannot be put into operation this season.

Work has, however, been commenced and at the present moment 12 ten-acre paddocks have been partially stumped and fenced off, and it is hoped to obtain a certain amount of information on these paddocks during the present season. One of the principal objects of the experiments at Matopos is to determine the influence of various artificial fertilisers applied individually and in various combinations on the chemical and botanical composition of the herbage, and on the rate of growth and productivity of grazing animals.

The experiments being carried out at Matopos will be duplicated on the area of land to be set aside for pasture work on the Lendy Estate.

The grazing on this Estate is probably as poor as any grazing to be found in the Colony, and should it be possible on Lendy Estate materially to improve the grazing, it should be possible in any other part of the Colony.

Travelling.—During the year under review a considerable number of requests have been received from Farmers' Associations for lectures at their meetings and for visits to farms in the various districts. As far as possible these requests have been complied with, but it is regretted that in many instances it was not possible for an officer to visit the district owing to pressure of laboratory and administrative duties.

Lectures were delivered on various subjects at eleven farmers' meetings, and two lectures were given to the pupils at the Salisbury Tobacco Experiment Station.

One member of the staff was engaged from the 2nd to the 8th October making a soil reconnaissance of part of the East Clare Estate, Que Que.

The Chief Chemist was absent from office from the 20th February until the 23rd March visiting the various Agricultural Schools in the Union of South Africa for the purpose of acquainting himself with the research work going on in the Union into problems of veld management and improvement. A report on this visit was submitted to the Secretary for Agriculture on 30th April, 1929.

Two members of the staff attended the meetings of the British Association and the Pan-African Conference held in Pretoria during August.

The Chief Chemist, by direction, acted as entertainment officer to Major Walter Elliot, M.P., and Mr. Ryan of the Empire Marketing Board during their visit to the Colony, and also accompanied Sir Daniel and Lady Hall during their tour of the Colony.

Members of the staff were in attendance at the Agricultural Show held in Salisbury to explain the exhibits of the Division.

Publications.—The following articles were published by members of the staff in the Rhodesia Agricultural Journal:—

"Farmyard Manure."

"Instructions for taking Soil Samples."

"Notes on the water culture divisions by the Division of Chemistry at Salisbury Show."

"The value of rock phosphate and bone-and-superphosphate as fertilisers for maize production."

"The mineral aspects of pasture nutrition in relation to the livestock industry." (Paper read before the British Association at Pretoria on 2nd August, 1929.)

Staff: New Appointments.—A. A. Morris, M.Sc. (S.A.), B.Sc., D.Phil. (Oxon.), appointed Assistant Agricultural Chemist on January 28th, 1929.

N. F. Hudleston and H. D. Cazalet were appointed as field workers for the Pasture Improvement Experiments, and were sent to the Rowett Institute, Aberdeen, for a short period of training. These workers returned to take up their duties on November 1st. Mr. Hudleston has taken charge of the pasture station at Matopos, and Mr. Cazalet will take over the pasture work at the Lendy Estate, Marandellas.

Vacation Leave.—Miss J. M. Anton was absent on leave from 1st July until the 2nd December.

Acknowledgment is made of the loyal and efficient services rendered by all officers of the Division during the year.

A. D. HUSBAND,

Chief Chemist.

Annexure "G."

DAIRY EXPERT.— ANNUAL REPORT.

Dairying Season, 1929.—The year opened well with good rains in January, but the greater part of February was dry and the grass quickly came into seed. Heavy rains at the end of February and an exceedingly wet cold spell during March caused a good deal of discomfort among stock and a fairly heavy mortality among young calves.

The winter was not exceptionally cold and grass and water supplies remained good until well into October. October and November were months of intense heat, which was very trying to milking stock, and this extreme heat ,accompanied as it was by close, hot nights, made dairy operations very difficult. Much third grade cream was produced and cheesemakers had a very trying time. The rains came late in November and afforded alleviation to the situation. Grass came on quickly, especially in Matabeleland, and the quality of the dairy produce at once improved.

The practice of providing winter feed is making some progress, especially in Mashonaland; more attempt is being made to conserve succulent feed in the form of silage, but the wet weather in March flooded many silage pits and much silage proved wasty and unpalatable.

Pumpkins were not a success as a crop, but majordas grew well on the lighter soils and, to a certain extent, saved the situation by providing succulent feeds both for cows and pigs. Maize proved to be only a moderate crop, but sunflowers did fairly well. The value of this easily-grown crop is only now beginning to be realised. As feed for stock of all description, it has proved itself to be the cheapest and most reliable source of protein, and every portion of the plant is edible with, of course, the exception of the hard fibrous stalk. It has also the merit of being easily grown and can be planted late in the season.

Ground nuts proved disappointing in their yield, with the consequence that ground-nut cake became extremely scarce and dear during the latter portion of the winter and early spring. This scarcity was much to be deplored, because many farmers had begun to appreciate the value of cake as being essential for winter milk production, and for the bringing on of young stock to early maturity.

Not enough use is made of hay as a winter feed for stock, and there appears to exist a disinclination throughout the Colony to cut hay early in the season. Many farmers missed a golden opportunity during the dry weather of February to cut grass, with the result that the hay cut later in the season was only fit for bedding and was quite unpalatable to dairy stock. Good, well-got hay certainly saves the feed bill in the winter and no effort should be spared in future seasons to cut grass at the right time and to conserve it in the stack.

Dairy Stock.—The demand for good dairy stock is greatly in excess of the supply and in many cases the price is almost prohibitive. High prices may be justified in the case of town dairymen, but for the average farmer, who is producing cream, such prices are not an economical proposition.

Very little attempt is being made locally to supply the demand in the Colony, and speculators from the Union have had no difficulty in disposing of grade cows in milk, or on the point of calving, at remunerative rates. It is a distressing fact that year after year these cows are sold to Rhodesian dairymen, who would much prefer to obtain their requirements from local sources; thus ensuring that the animals are thoroughly acclimitised. The position, however, has altered considerably during the year under review. Owing to the slump in wool in the Union, farmers are endeavouring to switch back to dairying, and the price of good dairy stock has hardened considerably, with the result that it is extremely probable that good class animals, in the near future, are likely to be obtainable from the Union. Rhodesia then will have to be dependent on its own resources. The number of farmers who have attempted to hand-rear their calves and keep milk records in the past has been disappointingly low, but this small number is now reaping a good reward. There is no difficulty in obtaining as much as £30 to £35 for grade cows which will milk without their calves.

Ordinary cows can be obtained for prices ranging from £8 to £10, and the margin between the price paid for such animals and that paid for average hand-reared dairy cows is so great that it is difficult to understand why more farmers do not attempt to cater for this trade. The hand-rearing of calves is not difficult.

Very little expense in the way of organisation is required, and it has been amply proved that excellent dairy heifers can be reared under average farm conditions. Such heifers are so tame that they can be guaranteed to milk without their calves and to give every satisfaction as milk cows. Under average circumstances, it does not cost more than £9 to £10 to bring such heifers to the producing stage, and when they can be sold at prices already mentioned it can be seen that a handsome profit can be realised.

Full details as to the methods of hand-rearing calves can always be obtained on application, and it is hoped that dairy farmers everywhere will attempt to make Rhodesia self-supporting as far as the supply of dairy stock is concerned. On this essential supply the future of the dairy industry depends, and, with the opening up of the great mining areas in the North, there is certain to be a great demand for milk cows to supply the fresh milk trade.

At present these mining areas, and even some mining areas nearer home, are to a large extent dependent on tinned milk. This is only a phase in development, and where fresh milk is available it is eagerly bought at very remunerative rates. Every encouragement is being given to farmers to purchase dairy stock, but it is often distressing to observe that the young stock is not well cared for, and that their physical development is a stage worse than that of their parents. Unless greater interest is shown in the development of the rising generation of dairy animals, the future of the dairy industry in this Colony can only be regarded with misgiving.

As noted in last year's Report, more frequent visits to the Government Farms at Gwebi and Matopos will convince farmers that as good dairy stock can be reared on Rhodesian feeds and under Rhodesian conditions as anywhere in the world. The importation of dairy stock from Great Britain to these two Government farms is a milestone in the dairying history of the Colony. The demand for Red Polls is so great that it cannot be supplied, and the fine herd installed at Matopos Farm should, in course of time, supply breeding stock which cannot help but have a profound effect upon the improvement of the breed in the Colony. Besides Red Polls, Ayrshires and Jerseys have been introduced. The demand for Ayrshires is growing, and they are likely to succeed on our lighter soils. Jerseys, on the other hand, are more adapted for plotholders, and should also be in great demand by dairy farmers who wish to increase the percentage of butterfat in their mixed milk at a time, such as during September and October, when it is naturally low. The keeping of a few Jersey cows for this purpose is customary in older countries, and might with good effect be tried by dairymen who supply milk to our large urban centres.

At Gwebi Farm the Friesland herd is showing distinct progress, and during the period when grazing is good the average yield per cow is slightly more than four gallons. This is very good indeed and disposes of the argument that the climate and altitude of Southern Rhodesia adversely affects milk production. The Gwebi herd average is much above that obtained in many herds in England and America, and in Rhodesia the 1,000-gallon cow is not so rare as some farmers would lead us to believe.

Creameries.—New additions have been made to the number of creameries in the Colony by the erection of a second well-equipped creamery at Gwelo and one at Fort Victoria.

The older-established creameries at Buawayo, Salisbury, Gwelo and Umtali have had a very successful year; although figures are not yet available it is anticipated that the aggregate production of creamery butter throughout the Colony will constitute a record. Fresh sources of supply are everywhere being tapped by the introduction of motor transport, and farmers in outlying areas are now enabled to market their cream to good advantage. Such districts as Enkeldoorn and Chipinga which, not many years ago, were practically isolated, are now comparatively prosperous, and it is amply proved that the dairy cow and the pig are the mainstay of the farmer to a much greater degree than was ever imagined.

The pastoral industries have for years carried Union agriculture, and history is repeating itself in Rhodesia.

The expansion of the dairy industry in Mashonaland noted in previous Annual Reports still continues, but it is extremely disappointing to report that nothing has been done to cope with this expansion by building a Creamery in Salisbury sufficiently large for present as well as future requirements. As mentioned in last

year's Annual Report, no good purpose can be served by farmers increasing their output of first grade cream if the equipment for turning this cream into first grade butter suitable for export is lacking. This matter of the provision of a new Creamery in Salisbury is very urgent, and unless some move is made, and made quickly, either co-operatively or by private enterprise, the dairy industry in Mashonaland must receive such a set back that it will take years to recover.

It is certainly anomalous that large trading concerns shew, by their extensive building programmes, that they have confidence in the country when our primary industries are neglected, starved and apparently despised.

Milk Recording.—As noted in previous Reports, the average standard of milk production in this Colony is still abnormally low. The voluntary scheme of milk recording which has been in practice for six years has attracted some support and created a good deal of interest, but it was felt that records which were official and recognised by the various Herd Societies throughout South Africa would arouse much greater interest, and create greater confidence in the milk production of Rhodesian cows.

Two official Milk Recorders were, therefore, appointed in July, whose work it is to travel amongst the farmers and check weights of milk produced, and to conduct official tests for butter fat. These officers have a large area to cover and it appears that ,as soon as the value of milk recording is more thoroughly realised, more officers will necessarily have to be appointed to cope with the additional work.

Those farmers who have kept records in the past know that it pay handsomely to have records to shew to intending buyers. The cost of having a cow tested varies according to the number in test from 10s. to £1 per head per annum, and the possession of a record certificate often enhances the price of a cow by £10 to £15. When milk bulls are being bred, the possession of a certificate shewing the production of dams and grand-dams is all important and on the larger Union Sales bulls of a dairy breed without milk records behind them are almost universally passed through the ring without a bid. The lack of locally bred bulls from milk recorded strains causes Rhodesian farmers to go to the Union for their requirements. The long journey and the risk of the bull reacting to the tuberculin test, does not deter them because they know that locally bred bulls with records behind them are almost unobtainable except from Gwebi Farm. This demand for locally bred bulls opens up a lucrative field of enterprise which should receive immediate attention.

Milk Recorder Fitt, who is stationed in Salisbury, and who carried out official tests throughout Mashonaland, reports that, since the 1st July, 1929, official tests have been made in the case of 118 pure bred cows, and that 288 grade cows have been tested. The total number of tests made up to the 15th November, 1929, was 1,108.

In addition to his duties as official Milk Recorder, each officer does "extension" work and gives advice on general agricultural practice.

From the 1st July to the 15th November, 1929, Milk Recorder Fitt has visited 129 farms in his capacity as Extension Officer. From reports received, it appears that his work is highly appreciated by the farming community.

Milk Recorder Trenor, who is stationed at Bulawayo, reports that 14 farmers have entered cows for official and semi-official testing, and that on the 15th November there were 64 cows in test. The total number of tests made in the period was 550. This officer also does " extension " work in addition to his work as Milk Recorder.

From the figures quoted above, it appears that farmers do not yet support the milk recording scheme as well as they should. In order to encourage the practice of testing of all the cows in the herd, the fee for testing has been fixed at a low figure. In the case of pedigree, as well as for Grade cows, the fee charged works out at 6d. per test for the first ten cows and 3d. per test for all tests over and above ten. This scale of charges is extremely moderate, and it is hoped that, as the advantages of milk recording are more thoroughly realised, in future years the number of cows entered will increase to a very considerable degree.

South African Butter Stabilisation Association.—As noted in a previous Report, this Association has been formed with a view to safeguard the Creameries throughout the whole of South Africa, against loss in the event of there being a surplus of butter for export. The foundation of this Association did much to stabilise the price paid for butterfat during the greater part of the year under review at a very satisfactory figure. The advent of a most abnormally good season in the Union has had the effect of depressing prices, and the Board of this

Association, of which the majority of the Creameries in Southern Rhodesia are members, having been working very hard in order to evolve a levy scheme which will be acceptable to the management of every Creamery in the whole of South Africa.

If this scheme is carried out to a successful issue, dairy farmers may look for higher prices than they have been receiving since October, but if divided counsels prevail, the price of butterfat must come down to export parity.

Some dissatisfaction has been caused by the low prices paid in the latter portion of the year, but farmers must realise that, as Sir Daniel Hall pointed out in Salisbury, the local price is, in every instance, to a large extent controlled by the price obtained for the exportable surplus. There has been a series of years of shortage of dairy produce throughout South Africa and farmers have been accustomed to receive prices above the world's parity, and they should not complain, because in the present flush season they are obtaining a price which is largely fixed by the law of supply and demand. Another factor which has depressed the price of butterfat during the last two months of the year has been the excessive amount of third grade cream produced during the hot weather preceding the rains. Third Grade butter always has to be sold at a loss in Southern Rhodesia because the local market is so limited and these losses have to be met. If Rhodesian dairy farmers produced nothing but first grade cream, the difficulty of low prices in the early part of the season would be readily overcome.

Cheesemaking.—The cheesemaking industry is recovering ground lost during the years of the tobacco boom, and it is anticipated that the local production for the year will exceed very substantially the production of the two previous years. As already noted, grass and water supplies remained plentiful and this enabled the cheesemaking season to be extended well into July. A few cheesemakers continued active operations right through the year, although the heat of October and November was very trying and it was impossible to manufacture normal cheese.

The price throughout the year has remained firm, but there has been a tendency towards a reduction during the last two months of the year. This is due to overproduction in the Union, and, in consequence, there is likely to be keen competition from the south during the ensuing season.

No new factories have been opened during the year, but a larger number of farmers are attempting to make " farm cheese " on a small scale, and this will have the effect of swelling production.

No cheese has, during this past season, been made in Matabeleland. This is surprising because the grazing in that Province was extremely good and milk was fairly plentiful. The Dairy Officer, who is now stationed at Bulawayo, is only too anxious to encourage farmers to supply the Colony's requirements with cheese. At present the local demand far exceeds the supply. There is no present danger of overproduction and should application be made for information on cheesemaking no effort will be spared to make this enterprise a success.

Besides local markets there exists a growing demand in Northern Rhodesia, Nyasaland and Portuguese East Africa, and farmers should be quick to take advantage of the openings offered to them to dispose of their dairy produce in a form which, after the fresh milk trade, is the most lucrative of all branches of dairy farming.

Dairy Organisation.—It is regretted that dairy farmers did not wholeheartedly support Mr. H. Martyn-Green's scheme to reorganise the dairy industry on co-operative lines and that he felt compelled to retire from the campaign which he had so long organised and led. The attempt to obtain 75 per cent. support is, however, by no means yet abandoned, and the carrying on of the organisation has been handed over to the Rhodesia Agricultural Union. The Secretary of the Rhodesia Agricultural Union and his Dairy Committee are working hard to achieve success, and it is hoped that those interested in the dairy industry will rally to the support of a scheme which appears to offer the only solution of our dairying and marketing problems.

Town Milk Supplies.—No difficulty seems to have been experienced in maintaining the milk supplies throughout the year, and in Salisbury and Bulawayo ample supplies were available throughout the winter. This is largely because of the widening of the area from which milk can be transported by motor transport, and the fact that many farmers have realised that " there is money in milk."

Because of the better appreciation of the value of feeding and because dairy stock is now being more suitably fed and housed, there is likely to be an over-production throughout the coming season, and it is interesting to note that both in Bulawayo and Salisbury steps are being taken to form milk " pools " on co-operative lines, so that overlapping of effort may be avoided and dairy farmers may be assured of a reasonable interest on their capital and a fair return for their labour. It is hoped that this may be achieved without in any way raising the price of milk to the public. In this connection, it is encouraging to report that there is a growing appreciation of the value of milk as an article of diet, and that consumption of fresh milk is increasing throughout the Colony. It would, therefore, be folly on the part of the supporters of a co-operative pool to attempt to raise prices. The tendency should rather be in the opposite direction so that the increase in consumption may not be checked but rather encouraged.

Experiments conducted throughout the civilised countries of the world have proved the value of milk as an article of diet to school children, and in the United States of America a campaign, organised by the National Dairy Union, has had the effect of increasing the consumption of milk and milk products, such as ice cream, etc., to a very marked degree. A similar campaign, on a small scale organised by our dairymen, would no doubt have good results.

Any information which may be required to further the campaign is always available on application being made to any officer of this Division.

Dairying in Matabeleland.—Mr. J. R. Corry, who is now stationed in Bulawayo, has some interesting remarks to make upon the Creamery position in Matabeleland.

Inter alia, he says, " The present state, as far as the creameries in Matabeleland are concerned, is somewhat unsatisfactory; at the moment there are six creameries operating in this territory, all of which contribute their quota towards the total quantity of butter produced locally: two of the larger creameries, however, could easily cope with the entire output of cream in this territory. There are, therefore, too many creameries in Matabeleland; it should be borne in mind that superfluous creameries constitute a burden on the industry and merely serve to foster an unhealthy spirit of rivalry which cannot operate for the ultimate good of the Dairy Industry. I am strongly of the opinion, therefore, that the time has arrived when legislation should be adopted with a view to remedying, or at least preventing, a recurrence of this obviously undesirable state of affairs. The Division of Dairying should be empowered to refuse registration or renewal of registration to any creamery or cream depot in any area in which the requirements of the producers are already adequately served."

It will be remembered that a similar state of affairs existed in the Union two or three years ago, and that the redundant creameries and cream depots were closed by mutual arrangement between the companies who owned these factories and depots.

The position in the Union is, therefore, much healthier than it was some years ago and much overlapping and wasted effort has been avoided.

Unless some similar arrangement is made in Matabeleland it is obvious that " the unhealthy spirit of rivalry " must ultimately act to the detriment of the Dairy Industry. It cannot be too often emphasised that we are faced with a crisis in the dairying position, and that should we have a succession of bountiful seasons the price of cream must be reduced. It is obvious that mass production reduces overhead costs, and if the available cream is divided amongst a plethora of creameries, a position will quickly arise when none will pay, and the farming community will, of course, be the ultimate losers.

Mr. Corry goes on to state that the cream output in Matabeleland is being swelled by cream which is produced by natives and that " in the near future native cream production will constitute an important feature of the Dairy Industry in Matabeleland. At the present moment the chief native producing areas are those situated in close proximity to Gwanda. Native cream production is steadily increasing in the Mphoengs and Raditladi Reserves which lie on the south-east border of this Colony; no less than ten cream depots have been erected, or are in course of construction, in these reserves, while the erection of a considerable number of depots in the Semokwe and Nata Reserves is also contemplated.

These depots, which serve as central separating stations where milk produced by natives is separated and cream is stored pending despatch to the Creamery, are all required to be registered under the "Dairy Produce Act" and a certificate obtained that the premises concerned comply with the regulations; one condition of registration is that all separating operations, etc., should be conducted, as far as possible, under white supervision."

The Pig Industry.—The pig rearing industry still continues to make satisfactory, if rather slow, progress. Pigs in Mashonaland maintain their popularity, but, owing to previous bad years in Matabeleland with a subnormal mealie crop and a shortage of milk, the numbers of breeding stock in that territory have been very much restricted.

Numerous enquiries are, however, now being received for good sows and well-bred boars, and it is hoped that the number of pigs available for export to the Northern markets will increase to keep pace with the expansion of that market

The Neill's Bacon Factory reports that, although the present supply of pigs is maintained on a level with that of previous years, yet they cannot exploit the Northern markets because the Rhodesian and Nyasaland requirements absorb all their available supply. More pigs, therefore, are required r ight throughout Rhodesia, and farmers would be well advised to extend their pig breeding operations in order to supply the demand in the North. At present it is feared that practically all the Northern demand for bacon is supplied from Union and Overseas sources. It is to be much regretted that the Board of the Farmers' Co-op. Industries, Ltd., have been compelled to close down their Bacon Factory in Salisbury. It is hoped that this stoppage is only temporary, and that in the near future the Factory will be re-opened.

The erection and equipment of a Bacon Factory in Bulawayo seems very necessary, but it is obvious that this will not be built unless the promoters of this enterprise see a reasonable prospect of their requirements, as regards bacon pigs, being supplied. At present most of the pigs in Matabeleland are either killed for pork or are exported on the hoof to Union or Northern markets.

The Large Black pure and the Large Black Berkshire cross still remain the most popular pigs with local bacon-curers. Some attempts have lately been made to popularise the Middle White pig, but this pig is not favoured by the Bacon Factory. It is pointed out that young white pigs are more susceptible to the effects of the tropical sun than black pigs, and that their growth is deterred by exposure. All young animals in this country require to be kept in the shade for the first three months of their lives, and it is reasonable to suppose that young white pigs suffer more than the black pigs when this shade is not provided. There is no doubt but that "sunscald" is very prevalent among white pigs in this Colony, and its blemishing effects are to be clearly seen on the rind of the bacon made from the carcases of pigs of the white breed.

In connection with the above it is interesting to record that the management of the Estcourt Bacon Factory, which the largest bacon curing establishment in South Africa, has recommended the abandonment of the Middle-White pig as a baconer and is recommending the Large White-Tamworth and Large White-Large Black crosses.

It is anticipated that arrangements will be made to import animals of at least two of these breeds from England for Gwebi Farm. These animals will be obtained under the scheme sponsored by the Empire Marketing Board, and it is hoped that experiments carried out on this farm as regards the production of bacon pigs, will be of service to farmers in demonstrating the right breeds, the right feeds, and the right cross for Rhodesian conditions.

Staff.—Mr. J. R. Corry, Assistant Dairy Expert, was transferred to Bulawayo in March, 1929. His headquarters are in Scott's Buildings, Bulawayo, and his postal address is P.O. Box 566, Bulawayo.

Mr. F. A. Lammas was appointed additional Assistant Dairy Expert in October, 1929, and is at present stationed in Salisbury.

Mr. R. H. Fitt and Mr. T. J. Trenor were appointed Official Milk Recorders in July, 1929. Mr. Fitt is stationed in Salisbury and Mr. Trenor in Bulawayo.

I wish to express my thanks to all these officers for their consistently good work during the past year.

T. HAMILTON,
Dairy Expert.

Annexure "H."

REPORT OF THE WORK OF THE POULTRY DIVISION,

Year Ending 31st December, 1929.

The year under review has been one of considerable expansion and steady progress. The large increase in the requests by farmers for assistance has made it necessary to appoint an additional technical officer to the staff of the Poultry Division, and recent events have combined to direct general attention to the economic importance of poultry on the farm.

General expansion of the industry has been observed throughout the Colony and a steadily increasing number of farmers are specialising to a greater or less degree in this branch of the farming industry, even in the more remote districts in which poultry farming hitherto received very little attention. This, undoubtedly, is due in a large measure to the markets being made more easily accessible for poultry products by the regular motor lorry service which has been inaugurated by the Southern Rhodesia Railways. Improvement in the methods of housing, feeding and general conditions have been equally noticeable. It is noteworthy that the expansion in many directions has been more permanent during the year than hitherto, and a number of large modern commercial and breeding plants have been established. This definite progress applies more particularly to the Midlands, Matabeleland and the South-Eastern districts of the Colony during the year under review. There is no longer any mystery about the methods of proper housing and management. The mortality which was formally experienced has greatly decreased and the volume of business in eggs and table poultry, including waterfowl and turkeys, has considerably increased.

Although this industry is making remarkable progress, there yet remains much to be done. Eggs are imported to fulfil increasing contracts in Southern and Northern Rhodesia, there is still the seasonal scarcity of eggs and consequent shortage for a comparatively lengthy period of the year, and the supply of good quality table poultry is irregular and suitable birds often difficult to obtain. The commercial poultry farmer whose main object is eggs for market, realises there must be a reduction in costs and an increase in production. The specialist breeder, whether in a large or small way, knows that the work must be conducted on modern lines or go to the wall.

Poultry farmers have had a very successful rearing season this year, and it is thought the production of eggs will be greatly increased and will be larger in fact than it has ever been in the past in this Colony. It is being realised that in view of the agricultural interests, the natural suitability of this Colony and the economical conditions under which poultry can be raised, there are vast opportunities in this industry.

Poultry Farming as a Business.—Poultry farming has been encouraged throughout the Colony chiefly from a commercial point of view. The industry requires small initial capital and gives quick returns, and is adaptable to all systems of farming. Eggs and table poultry can be produced at a greater profit by the general farmer than by any other system of poultry farming. The most reliable and remunerative features of the poultry industry are found to be :—

(a) Commercial Egg Production.
(b) Breeding and sale of stud stock, baby chickens and eggs for incubation.
(c) The production of table poultry which includes fowls, ducks and turkeys.

Commercial Egg Farms.—Commercial Egg Farms are to be found in practically every section of the country and many have extended during the year and are now carrying over 2,000 laying birds. A large number of general farmers, too, have developed the poultry branch of their farm work, and derive a good income from their poultry. Poultry and Horticulture form an ideal combination and in many localities fruit trees are being planted in the runs or the orchard or grove systematically laid out for the poultry to range in. The poultry under these conditions eliminate insect pests, keep the land free of weeds and manure the soil. One hundred fowls will keep an acre of orchard in a high state of fertility. Several commercial egg farmers derive a monthly cheque of £100. The highest monthly cheque paid to members of the Egg Circle during the year for eggs supplied was £125. The majority of established egg farmers derive an income of

£50 to £100 monthly. The Egg Circle does not by any means control the entire output of eggs in this Colony. Many of the largest poultry farmers are not members of this organisation, and sell their produce direct to the consumer. The question whether the producer can afford to employ direct marketing depends upon his proximity to the consuming market and upon the time and expense entailed in establishing and maintaining a trade for all or the bulk of the product. The prices paid by the Egg Circle have been nearly as good as for deliveries direct to the consumer.

Eggs.—The volume of business done by the Southern Rhodesia Egg Circle has increased each successive year. The number of eggs handled by this Organisation for the year under review was 4,152,036, value £38,101. The turnover for the previous year was £37,300 and 4,018,000 eggs were handled. The value of eggs imported to Rhodesia by all sources was £22,000 in 1929, as compared with £21,140 in 1928. The Egg Circle imported in respect to these value 1,555,760 eggs in 1928, value £11,474, and 723,600 eggs, value £5,848, in 1929.

The export of eggs to the Northern Territories has gradually increased during the past four years from 42,210 eggs in 1925 to 113,823 eggs to June, 1929. The bulk of the eggs imported into Rhodesia are exported to northern markets by this Organisation, but there are a number of independent importations of eggs for local consumption. It is noteworthy that whereas the Union Egg Circles and the Southern Rhodesia Egg Circle have up to the present co-operated in the export and import of eggs to the Rhodesias, non-co-operative bodies, chiefly in the Union, are now endeavouring to enter the northern markets. Such exportations from the Union of South Africa consist in a large measure of eggs which are unfit for export overseas. The Southern Rhodesia Egg Circle is likely to be affected on account of the ungraded surplus eggs from the south undercutting the price of better quality eggs exported through co-operative channels.

Stud Stock and Sale of Day-old Chicks and Eggs for Hatching.—The breeding season this year opened with a very good demand for stud stock and day-old chicks, and it became necessary for several pedigree breeders to increase their incubating plant. Eggs for hatching were in less demand. The policy of the division is to encourage those poultry enthusiasts who have a natural inclination for pedigree breeding. The commercial egg farmer who is interested in poultry cannot be expected to attain the highest success in pedigree work; there is generally not the time nor the inclination to devote to the work. In consequence of this policy there is likely to be a growing demand each year for day-old chickens on the part of farmers who confine themselves to commercial egg production. They benefit by the experience of successful pedigree breeders, but more uniform and profitable stock can be distributed throughout the country. There is also a considerable reduction in their outlay in buildings and the necessary appliances required for incubation. It is necessary for the pedigree breeder to build a reputation on his merits and he should be content to specialise in this business and provide for the distribution and sale of day-old chicks. Commercial egg farmers should confine themselves to their egg cheque and depend on recognised breeders of good stock to replace their laying flocks. This advice applies particularly to the general farmer. Poultry farmers who essentially carry out pedigree breeding, but who have commercial egg laying flocks, are more successful in increasing the average production of their flocks than the strictly commercial egg farmers, who endeavour to carry out systematic methods of breeding, or those who strive to improve or build up their stock by out crossing or inbreeding. It is only after the poultry farmer by study and experience has acquired skill in general management, that it is possible for him to determine what particular line of poultry farming is most suited to his temperament and conditions.

The Southern Rhodesia Pedigree Register.—This was organised in 1928 and is being conducted by the Poultry Division of the Department of Agriculture with a view to encourage pedigree breeding and accelerating the proper selection and mating of breeding stock to eliminate disease and inferior stock, and to encourage the distribution of reliable stock of the best quality. Last year the total number of birds entered for recording was approximately 1,300. This year there are 2,200 birds entered. It is very gratifying to state that this scheme is progressing very satisfactorily.

Table Poultry.—Owing to a lack of authentic statistics it is very difficult to give exact figures of the total value of table poultry, i.e., fowls, ducks and turkeys, consumed or produced in this Colony. Although there is every indication of an increase in the growth of this industry, the development is not as pronounced as that of egg production. The development is more local than general. The demand for table chickens and ducklings is constant and regular at good prices, more or less the year round, while turkeys are chiefly in request on special occasions but more especially at Christmas. There is room for further development in the production of good table poultry, but the consumer has yet to exercise more discrimination in the quality of table poultry. The duckling is easily kept under control, and is comparatively free from disease and insect vermin. It makes very rapid growth and is ready for marketing at an early age. Ducklings may be raised all the year round in Rhodesia. The turkey is said to be one of the most economical birds for the farmer. A prominent habit or characteristic of the turkey is to range great distances in search of insects and other foods. They are hardy when reared or at any period if given reasonable attention. During the reaping season they will convert an enormous amount of waste into hard cash. They will keep insect pests under control if herded in cropped fields and on the whole they are very useful and profitable when raised under farm conditions.

Government Experimental and Demonstration Poultry Station.—The growing importance of the poultry industry in this Colony has received further recognition by the Government in the provision this year of a substantial sum of money to be used for the inauguration and equipment of a Demonstration and Experimental Poultry Station. There is an urgent need for investigational work into such matters as breeding, incubation and feeding in relation to our particular subtropical conditions, and an attempt will now be made to give a lead to poultry farmers in this respect. The matter of costs is an important factor in poultry rearing, and it will be one of the first objects of the Station to demonstrate economical methods of breeding and commercial egg production, in addition to the production of table poultry. For this purpose a site has been provided at the Agricultural Experiment Station, Salisbury, of approximately eight acres in extent. This area is being systematically laid out and subdivided to accommodate a semi-intensive breeding and commercial plant ann an extended Egg Laying Test. Houses and runs for chickens and ducks are in the process of erection and approximately 600 trees will be planted this season. Every effort is being exercised to make the layout as neat and attractive as possible. It is anticipated that a wide range of the various breeds of poultry, including water-fowl will be stocked for the requirements of this Station. A building 107 feet long has been erected, which contains 10 breeding pens to start with. These pens have been designed on modern lines to demonstrate economy in design, convenience in the arrangement of the internal fittings and labour saving methods in attending the birds. It is anticipated that a further two breeding pens will be erected from the material on hand to demonstrate on a small scale a system whereby a combination of poultry keeping, vegetable growing and horticulture may be effected.

A site has been selected for a similar demonstration poultry station at the Matopos School and a proposed plan of the layout of this site has been drawn up. It is proposed for the purpose of both of these stations to erect buildings and coops and make utensils of various patterns and of the different materials that are easily obtainable and suitable for the conditions under which farmers have to provide for their poultry, with a view to economy, convenience and efficiency.

Southern Rhodesia Egg Laying Test.—The Rhodesia Railway Strike last February made it necessary to postpone the usual date on which the Test commenced to one month later. Thus, instead of commencing on the 1st March the date of the Tenth Egg Laying Test was postponed to April 1st and will continue for 44 weeks ending 2nd February, 1930. Several pens from the Union of South Africa which arrived at Bulawayo on the morning the strike was declared were re-railed to the Union. Many Rhodesian breeders in Matabeleland and the intermediate stations were also affected and were unable to dispatch their birds, whereas other birds were delivered to the Test pens by car, having in some cases travelled a distance of 300 miles. All these pens suffered considerably through exposure owing to the heavy rains and delay in transit. The birds had to receive special attention and in many cases no doubt they never entirely recovered, and developed such complaints as abdominal dropsy, internal tumours and cysts. Some birds although they had been laying previous to their dispatch to the Test,

did not lay on their arrival at the pens until four months had elapsed after the commencement of the Test. Nearly every pen was handicapped by moulting birds. A reflection of this will no doubt be seen in the aggregate number of eggs laid, but there are likely to be some satisfactory individual egg records.

The Rhodesia Egg Laying Test was inaugurated by the Government in 1921 and twenty pens were provided with trapnests to accommodate five birds in each, making a total of 100 birds. There is not the slightest doubt that this Test is answerable to a very large extent for the better quality of the stock, and the increased production of eggs throughout this Colony. This competition has become so popular that each year entries have been refused through a lack of sufficient accommodation. It has created a sense of keen rivalry and enthusiasm among poultry breeders and the results of the Test are published in the press every four weeks. As Egg Laying Tests have played no mean part in the development of the poultry industry of this Colony, it is the policy of this Division to encourage them in every way possible. We have progressed from the time when these tests were regarded as laying competitions and nothing more. They are now rightly regarded as the official means of testing potential breeding stock and to show what has been accomplished as the result of the previous season's selection and breeding. Our aim being the selection of foundation stock with standard qualities and profitable productive capacity, it is obvious that the official laying tests must play an important part in the proving of these qualities. The results demonstrated at the tests must be followed by proper mating if our stock is to be improved. The 1930-31 Egg Test will be held at the new site of the Government Poultry Station. Single pen accommodation has been completed during the year for the next and subsequent tests with double the original capacity. In the event of further extension being required in the future, provision has been made on this site to accommodate a maximum of 1,000 birds. The rules have been revised and attractive awards are offered for pen and individual records. A noteworthy feature of this Test is the introduction of a new section for " Single Bird "' Competition. Birds may be nominated by the competitor for the Single Bird Test from the pens entered. It is gratifying to state that at the time of writing the introduction of this section appears to be of interest and justifiable, according to the entries and the nominations for the test which have been received.

Poultry Clubs.—Annual poultry shows are held in various parts of the country by Poultry Clubs usually in conjunction with the Agricultural Societies. During the year under review poultry shows were held at Umtali, Rusape, Salisbury, Gatooma, Gwelo, Fort Victoria and Bulawayo. The adoption of modified standards of perfection whereby a large number of points are allocated for recognised characteristics of commercial poultry has almost revolutionised poultry shows throughout the world, the entries in this section now out number those of fancy classes. Poultry shows act as a necessary counter balance to Laying Tests to some extent. In the latter, high egg records are inclined to take precedence over breed characteristics with many poultry farmers, whilst in the former conditions are almost reversed. The ideal bird is a judicious combination of both, forming a profitable and productive breed with beauty.

Educational Work.—Undoubtedly the greatest single factor contributing to the successful development of the poultry industry has been the educational work of the poultry section of the Agricultural Department. The most important phase of this work embraces extension services which cover a wide field of activities. Personal visits to farms and attendance at Farmers' Association Meetings are excellent means of maintaining direct contact with the farmers and their conditions. The personal discussions on their own particular problems prove to be of real service to poultry raisers. The underlying features of most of the extension work is concerned with the economics of poultry. The outstanding service in this connection is the systematic culling or elimination of the non-laying and unprofitable birds, based on the changes of the body charasteristics in relation to egg production. This in conjunction with the practical work in the selection and mating of the breeding stock and the problems connected with incubation and rearing of chicks, which beginners have to contend with, necessitate paying regular seasonal visits. A voluminous amount of advice has been given through correspondence, poultry magazines, the Agricultural Journal and bulletins. Lectures and practical demonstrations have been frequently given at shows and Farmers' Association Meetings. The request for assistance from this Division by farmers during the year has been phenomenal and has been greater than in

any previous year. In addition to the call made upon this Division by farmers in Southern Rhodesia a considerable amount of correspondence and requests for bulletins on poultry have been received from Portuguese East Africa, Nyasaland, The Congo, Northern Rhodesia, and the Union of South Africa.

Diseases and Parasites.—Diseases and parasites are no more prevalent, in fact much less so, than in many other countries. Proper methods of hygiene are being adopted and the essential methods of prevention and elimination of disease and parasitic pests have been universally carried out, with the result that Southern Rhodesia can claim pride of place over many other countries in this respect. The fowl tick which is peculiar to warm countries and which has caused considerable loss in previous years in eggs or mortality is now noticeably on the decrease, particularly in areas where farmers are adopting the necessary measures for control. The principal sources from which this pest is spread, by the sale and distribution of poultry, are the native kraals.

Staff Changes.—Mr. A. Little proceeded on leave in May pending retirement on pension from the Service in September.

The following appointments in the staff have been made during the year:—

Appointment of Mr. H. G. Wheeldon as successor to Mr. A. Little. Appointment of two Assistant Poultry Officers, Mr. F. Roberts, who assumed duty on the 2nd September, and Mr. G. H. Cooper, who assumed duty on the 16th October.

Mr. Roberts was transferred to Matabeleland and he assumed duty at Bulawayo on the 1st November.

H. G. WHEELDON,

Chief Poultry Officer.

Annexure " I."

ANNUAL REPORT OF THE TOBACCO DIVISION FOR THE YEAR ENDED 31st DECEMBER, 1929.

The customary duties falling within the province of the Tobacco Division have been duly performed, though on a somewhat lesser scale than during the year 1928.

Good planting rains were general throughout the majority of the tobacco producing districts. The planting season opened during the first week in December, 1928—a date rather later than the usual time. The early sown seed-beds had, therefore, to be discarded as the tobacco seedlings were overgrown. A great number of plants from the second succession of sowings were also too large for transplanting. Many growers were in difficulty owing to the fact that their tobacco seedlings were either too advanced or too small for setting out in the field. The stand of plants in the field was excellent until the end of December, but after this date insect pests made their appearance and caused extensive damage, with the result that within a few weeks the stand of plants was considerably reduced. Mosaic disease was also very prevalent; the incidence being greater than during the previous year. Much difficulty was experienced in keeping down the weeds in the field owing to continued dull weather and incessant rain. The crop made very slow growth during the dull wet weather and commenced flowering before the plants had attained the requisite development. Cutworm were particularly active this season and did considerable damage.

A spell of dry weather during the month of January enabled the necessary weeding and cultivation to be proceeded with. By the end of February, the growth of the crop was disappointing, notwithstanding a good measure of sunshine during the month of January. Flue curing operations commenced in February and at this time a great deal of " false ripening " was in evidence. At a later stage during the curing season, a certain degree of difficuulty arose through the incidence of " second growth." In summing up the season as a whole, it may be stated that although the early part of the season was very promising, the subsequent seasonal conditions were unfavourable and resulted in a depreciation in the general quality of the crop.

The marketing problem has become no easier, and the indications are that this matter is becoming more acute.

The Rhodesia Tobacco Warehouse and Export Company, Limited, organised a series of auction sales to be held on the floor of their warehouse. The first auction was held on the 16th April, 1929, when a fair parcel of baled tobacco was purchased by local buyers and one visiting representative of an overseas firm. The second auction sale was arranged for a date early in May, after which the proposed series of sales was cancelled because the results of the initial attempts were held to be unsatisfactory and did not justify a continuance of this system of marketing the tobacco.

The difficulty experienced in disposing of the crop on overseas markets, and the generally low average prices which obtained, resulted in a considerable reduction in the acreage planted to tobacco during the year under review.

The final returns are not yet obtainable, but the estimated acreage is 16,271 acres, representing a reduction of 30,351 acres or roughly 66 per cent., while the corresponding estimated yield is 6,272,799 lbs., representing a decrease of 18,670,245, or 75 per cent.

The financial assistance rendered by Government has enabled many tobacco growers to continue their operations, consequently the reduction in acreage and yield has not been so great as would otherwise have been the case.

The production of tobacco over the period 1919-1929 is indicated in Table No. 1.

TABLE No. 1.

Season.	VIRGINIA TYPE. Acres Planted.	Yield in lbs.	Acre Yield in lbs.	TURKISH TYPE. Acres Planted.	Yield in lbs.	Acre Yield in lbs.
1919-20	5,546	2,435,994	435	1,958	511,633	266
1920-21	7,888	3,192,662	404	1,643	554,320	337
1921-22	9,007	2,880,104	318	1,167	302,255	259
1922-23	7,758	2,540,942	327	1,296	269,839	208
1923-24	7,001	3,426,390	489	1,002	452,070	451
1924-25	7,550	1,987,382	263	891	418,522	469
1925-26	13,160	5,313,186	404	755	346,623	459
1926-27	29,172	18,631,069	638	992	633,488	638
1927-28	45,711	24,491,464	536	911	451,580	496
1928-29*	15,292	5,943,821	388	979	328,978	336

*Note the figures relative to the 1928-29 season are estimates only. Final figures are not yet available as a total of 262 returns still remain outstanding.

Table No. 2 denotes the estimated acreage and yield of the several classes of tobacco produced during the season 1928-29.

TABLE No. 2.

CLASS.	VIRGINIA TYPE. Acreage	Yield in lbs.	Total	TURKISH TYPE. Acreage	Yield in lbs.	TOTAL ALL TOBACCO. Acreage	Yield in lbs.
Flue Cured	13,655	5,303,220		—	—	—	—
	*309	105,764	5,408,984	—	—	—	—
Fire Cured	1,145	455,239		—	—	—	—
	—	3,711		—	—	—	—
	†20	700	459,650	—	—	—	—
Air Cured	11	2,700		—	—	—	—
	§40	12,000	14,700	—	—	—	—
Sun Cured	82	29,631	29,631	979	328,978	—	—
Inyoka	30	9,656		—	—	—	—
	—	300		—	—	—	—
	—	4,000		—	—	—	—
	—	16,900	30,856	—	—	—	—
	15,292		5,943,821	979	328,978	16,271	6,272,799

NOTE: *This acreage includes 3,711 lbs. fire cured and 16,900 lbs. Inyoka.
†This acreage includes 300 lbs. Inyoka.
§This acreage includes 4,000 lbs. Inyoka.
There are 262 Farm Returns still outstanding, but it is not possible to say how much tobacco they will account for.

It is of vital importance that production be kept up to a reasonable level, and the danger of serious underproduction should be guarded against. If the total output is allowed to drop too low, then there would be a tendency on the part of manufacturers to favour the use of tobacco furnished by other countries with more regular and consistent annual production. The need for maintaining production at a proper level has been mentioned in Annual Reports issued during previous years, and due precaution still remains necessary. The marketing of Southern Rhodesian Tobacco in Great Britain can only become normal when the existing surplus stocks are reduced to a minimum, and until such time as this occurs the tobacco growers are in the very difficult position of having to guard against under-production which would tend to undermine the foothold already gained on the market, or alternatively against over-production, which would cause a continuance of the existing depression.

Further efforts to consolidate the position and to extend the present demand, must be made by all concerned, and to this end tobacco growers should endeavour to produce that class of leaf which will satisfy the requirements of manufacturers and consumers. The United Kingdom market presents greater potentialities than any other outlet so far investigated. In order to meet competition and create an increasing demand it is essential that the requirements in regard to types of leaf

and method of handling be definitely ascertained. Further action would then lead to specialised type production within well defined areas, and in this manner the special requirements of each individual buyer would be more fully met than is the case under the system now obtaining.

An initial move in this direction has been made through the distribution of, roughly, ten pounds weight of White Stem Orinoco Tobacco Seed. The above-mentioned variety is of a naturally heavier type than the Hickory Prior, and chanced to be the only other variety of seed available for distribution in time to be of use this planting season. Until reliable data becomes available through results obtained on the proposed Tobacco Research Station, no special preference can be definitely expressed towards any particular variety or varieties of tobacco. On broad lines, however, it is considered advisable, for the present time, to advocate the planting of suitable varieties which naturally tend to produce a heavier bodied type of leaf, which, it is understood, is preferred by manufacturers. The uncertainty which has existed since the Customs Conference held at Pretoria during September, concerning the Union market, is another factor which has emphasised the desirability of producing a larger percentage of the heavier bodied tobacco suitable for export overseas.

Further inspection of land for the establishment of a Tobacco Research Station has been carried out and negotiations for the purchase of a suitable site are at present proceeding.

The necessary research work will be commenced upon the satisfactory conclusion of these negotiations.

Preliminary investigations dealing with "Priming," "Topping" and "Suckering" are being carried out on the Salisbury Tobacco Experiment Station by the Tobacco Division.

Some 170 plots were planted by the end of December, 1929, the data accruing from this research will be available at the end of this present season. The work will be transferred over to the Tobacco Research Station, when the latter is fully established.

During the year 1929, the officers of the Tobacco Division made in all 646 visits to farms and spent 391 days on itinerant work.

The Assistant Tobacco Adviser stationed in Matabeleland also attended the Bulawayo and Gwelo Agricultural Shows. The Assistant Tobacco Adviser stationed in Salisbury assumed duties on the 28th January, 1929. This officer judged tobacco exhibits at two Agricultural Shows and attended two others; one lecture was delivered and two Farmers' Association Meetings were attended. Considerable time was also devoted to grading and testing germination of tobacco seed.

The Chief Tobacco Expert judged the tobacco and cotton exhibits at four Agricultural Shows, attended a total of 29 Farmers' Association Meetings and delivered eight lectures.

The following articles were published in the "Rhodesia Agricultural Journal" and reprinted in bulletin form:—

"Suggested Crop Rotations for Tobacco Growers."—D. D. Brown, Chief Tobacco Expert.

"Common Faults in Curing Virginia Bright Tobacco."—D. D. Brown, Chief Tobacco Expert.

"The Development of the Tobacco Industry."—D. D. Brown, Chief Tobacco Expert.

"Seasonal Notes on Tobacco Culture."—D. D. Brown, Chief Tobacco Expert.

A special Report was drawn up for the use of the Select Committee appointed to investigate the causes of depression in the Tobacco Industry. A memorandum dealing with the "Production and Marketing of Tobacco" was also prepared.

The long continued reliance placed by tobacco growers on the cultivation of one crop has been modified to a greater extent than was apparent last year. A further extension of this policy should afford more security and tend to equalise the effects of adverse climatic conditions, and also, in some measure, alleviate the position caused by difficulties in the marketing of the tobacco crop.

Due acknowledgement is made of the loyal services rendered by the staff of this Division during the year.

D. D. BROWN,
Chief Tobacco Expert.

Annexure " J."

REPORT OF THE FOREST OFFICER

for the Year 1929.

(Tenth Annual Report.)

INTRODUCTION.

It is again a pleasure to have to report progress. In many respects the year is a record one for the forest service. Ten years ago the forest service was constituted a branch of the Agricultural Department. At that time the staff was one forest officer and one nurseryman and the area of forest reserves was only 100 acres. To-day there is a staff of five professional officers, five foresters, one horticulturist and nurseryman, six apprentices and one clerk—eighteen in all. The area of forest reserves, i.e., land set aside for forestry is 666,403 acres; unreserved forest areas amount to 192,000 acres and national park to 224,000 acres. Total 1,082,403 acres. In 1920 the vote for the Forest Nursery was about £500. In 1929 the expenditure in protecting and building up a timber asset was £16,112 12s. 2d. Ten years ago the planted area was about 30 acres. To-day the planted area is 2,056 acres and arrangements have been made to plant at the rate of about 2,000 acres per annum. The plants raised and distributed in 1920 had a total of 159,212. In 1929 the total distributed and raised amounts to 4,505,522.

Public interest in forestry is abundantly shewn by the extent tree planting is being carried out by the farming community. Many companies and public bodies have thriving afforestation propositions. The services of Forest Officers are frequently made use of by the general public.

In a business proposition of the magnitude which State forestry inevitably becomes it is essential that the staff which controls the field operations should be properly trained and be efficient. To meet the want of properly trained technical men arrangements have been made for recruiting and training young Rhodesians. Six apprentices have been engaged and after a training extending over three years will be taken on the permanent staff. The forester appointments have been graded and arrangements made for properly housing all the field staff.

The progress made in forestry during recent years necessitated the decentralization of the officer staff. Instead of being attached as assistants at the headquarters in Salisbury the colony has been divided into four districts, namely, Western, Midlands, Northern and Eastern, with a district officer in charge of each. The headquarters of the Western district is temporarily at Fuller Siding; the Midlands at Mtao Reserve; the Northern at Salisbury; and the Eastern at Stapleford Forest Reserve. The officers in charge of each district will make special studies of the forest problems and direct all operations. Each of the foresters stationed within forest reserves is under the direct control of a district forest officer. Each forester has a patrol area allotted to him, thus every member of the field staff has definite administrative and executive responsibilities

To provide for a better utilization of indigenous and exotic timbers, Mr. T. L. Wilkinson, M.Sc.B.Sc.F., Assistant Forest Officer, was deputed to visit the Pretoria Research Station to study the latest methods of timber seasoning and preservation. Mr. Wilkinson is now available to advise all interested in the utilization of local timbers.

The Education Commission Report has stimulated interest in forestry and steps are being taken to establish school plantations. The Prince Edward School, Salisbury, has secured an area of 50 acres and arrangements for planting trees are well in hand.

The Arboricultural Society's energetic President is keeping the interests of the Society well before the public. Government aid has been given for the purchase of seed and at numerous centres transplants are being raised for distribution to members of the Society.

During last session of Parliament three Acts were passed, all having an important bearing on forestry, namely, Land Apportionment Act, Land Tax Amendment Act, and Native Reserves Forest Produce Act. Under the Land Apportionment Act an area of 590,500 acres has been set aside for forestry in the Nyamandhlovu, Bubi, and Wankie districts. Steps are being taken to demarcate the area, and on it carry out intensive fire protection as a preliminary to other forestry operations. The forests on the Kalahari sand areas in the districts of Wankie, Bubi and Nyamandhlovu are of immense potential value for the production of railway sleepers and mining timber of all kinds. The mining development taking place in Northern Rhodesia offers a market for huge supplies of mine props which can readily be produced simply by taking adequate precautions against fire.

The Land Tax Amendment Act provides for the exemption from taxation of land which is used for timber production, prevention of erosion and for the conservation of water supplies.

The Native Reserves Forest Produce Act provides for the protection and conservation of the indigenous forests and for the establishment of plantations. This Act places the forestry question on a sound basis and great benefit will result to the Natives.

Forestry operations on the Rhodes Matopo Estate have been placed under the control of the Forest Service and steps are being taken to extend tree planting activities. The Matopo National Park and Game Reserve in extent 224,000 acres situated in the Matobo district is in future to be administered by the Forest Service and steps are being taken to survey the area and render it accessible to the general public by means of roads and paths.

The Game Reserves in the Wankie district as from the beginning of next year will also be administered by the Forest Service.

The Stapleford Forest Reserve has been increased by the addition (by purchase) of the Minniglen Ranch in extent 41,885 acres.

During the year the timber concession granted to the Zambesi Saw Mills, Ltd., and situated in the Wankie district between Katuna and Kesi sidings was terminated by effluxion of time. The area between Fuller and Kesi situated on the Kalahari sand yielded large supplies of timber. The young growing stock is abundant and with continued protection from fire will become a valuable national asset.

The European Labour Scheme at Mtao continues to fulfil the purpose for which it was started. At the beginning of the year there were 55 employees and on the 31st of December there were 73 on the roll. The number of men sent to the station during the year was 120 and the departures 102. During the year two men died and were buried in a cemetery near the station. Each year improvements are made and better housing facilities provided for the men. During the year some twenty-six brick huts, a room for a library and another as a dispensary have been built as well as various minor improvements made.

On account of the old age of many of the men it is sometimes difficult to find suitable work for them, but as the plantations develop an increasing number of jobs will become available. In considering the cost of employing Europeans as labourers it must be remembered that the work is provided as a relief measure and because of this the whole cost should not be debited to forestry as is at present the case.

During the year the Honourable the Minister of Agriculture and Lands, accompanied by Dr. Brain, inspected the Mtao and Stapleford Forest Reserves.

STATE FORESTS.

The area of State forest reserves both reserved and unreserved as on 31st December, 1929, is as follows:—

Description.	Area on 1st January. Acres.	Added during the year Acres.	Total December 31st, 1929. Acres.
(a) **Reserved Forests.**			
Forest Nursery, Salisbury	100.00	—	100.00
*Mtao	15,498.37	—	15,498.37
Stapleford	18,420.30	41,884.90*	60,305.20
†Gwaai	—	299,500.00	299,500.00
†Ngamo	—	291,000.00	291,000.00
Totals	34,018.67	632,384.90	666,403.57
(b) **Unreserved Forests.**			
Masue (Timber Concession)	134,400.00	—	134,400.00
Fuller-Kesi	57,600.00	—	57,600.00
	192,000.00	—	192,000.00
(c) **National Parks.**			
Matopo National Park	—	224,000.00	224,000.00
Grand Totals	226,018.67	856,384.90	1,082,403.57

*Ranch Minniglen acquired by purchase.
†Crown land allotted for forestry by Land Apportionment Act, 1929.

GENERAL MANAGEMENT.

All the beacons of the Stapleford Forest Reserve have now been located. Steps are being taken to mark on the ground the boundaries of the new forest reserves at Gwaai and Ngamo.

Contour surveying at Stapleford was continued and the whole area is being divided into blocks having natural features as boundaries. Both at Stapleford and Mtao all planted compartments are properly numbered with compartment posts.

The usual annual plans of operation were prepared for all stations and are being carried out. In the Kalahari sand area shortage of labour interfered with the carrying out of all the contemplated operations.

At all stations careful records are kept of the dates of planting and subsequent treatment of different species of trees and in due time details of increment embodied in yield tables will become available.

Data in regard to the rate of growth of indigenous species are being collected. At Fuller Siding the girth increments of a few trees are as follows:—

	Date of first measurement.	Girth inches.	Date of remeasurement.	Girth inches.	Periodic increment inches.	Mean annual increment.
Pterocarpus angolensis ...	23.8.21	29.5	12.10.29	48.9	19.4	2.42
Pterocarpus angolensis ...	23.8.21	27.0	12.10.29	47.9	20.9	2.61
Copaifera coleosperma ...	23.8.21	53.0	12.10.29	61.9	8.9	1.10
Baikiaea plurijuga	23.8.21	23.5	12.10.29	33.25	9.75	1.22
Burkea africana	11.1.22	26.0	31.12.29	35.5	9.5	1.19
Afzelia cuanzensis	8.10.25	39.5	12.10.29	46.5	7.0	1.75

Protection.—All the forest reserves are carefully patrolled and offenders against the forest laws prosecuted. During the year six natives were prosecuted and punished for various offences.

Particular efforts are made to protect all areas from injury by fire. This is done by the clearing of fire-belts or by burning strips of sufficient width to prevent fire crossing the lines. The beneficial effects of fire protection are clearly shown on the Kalahari sand areas where large areas of young regrowth are approaching the stage when they are comparatively immune from fire injury. The increased canopy retards grass growth and the accumulated humus prevents erosion and conserves water. At Mtao the rigid protection from fire not only permits of a rapid increase of the humus content of the sandy soil, but water is conserved and this is clearly shown by the increased flow from springs. It is obvious that this increased flow permits of larger irrigation projects on farms adjoining the reserve.

At Stapleford belts 30 feet wide and eight miles long were burnt at a cost of £1 18s. 5d. per mile. At Masue 60.25 miles of fire-belt were cleared and scoffled at a cost of £1 8s. 2d. per mile. At the same place 45 miles of burnt strips were made at a cost of 19s. 10d. per mile. On the Fuller-Kesi area 72.25 miles were cleared and scoffled and 5.35 miles of new line cut at a cost of £1 3s. 2d. per mile. In addition burnt strips 28.5 miles costing £2 6s. 1d. per mile were carried out. The increased cost was brought about by having to reburn some strips. At Umgusa 71 miles of belts were scoffled and 4.30 miles enlarged at a cost of £1 9s. 1d. per mile. In addition 36.75 miles of burnt strips were made at a cost of £1 19s. 3d. per mile.

At Mtao 46 miles of firelines were scoffled and burnt at a cost of £1 13s. 6d. per mile.

Notwithstanding the precautions taken fires occurred at various centres, and as soon as reported or observed all possible steps were taken to have the fires extinguished. Most of the belts proved effective, but when fires are deliberately lit within protected areas and high winds are blowing counter firing has been resorted to. At Stapleford two grass fires occurred which burned over an area of 450 acres. The area burnt over is less than 3% of the total area which, considering the long dry winter, is very satisfactory. At Mtao three fires occurred involving an area of 718 acres. This represents 4½% of the area. This is not as satisfactory as the results obtained last year when the injury was confined to 1.5% of the area.

On the Kalahari sand forests year by year experience is gained in the control of fires on the huge areas involved. Fire protection operations have been hampered by the fact there is only one officer to supervise all the operations. Reliance must be placed on native wardens and individual natives and these do not always display the energy desired. An adequate labour supply when most wanted was unobtainable and this hampered the work considerably. Valuable aid was lent by the staffs of the Zambesi Saw Mills, Ltd., and the Rhodesia Native Timber Concessions. The areas burnt over represent 35% of the Masue area, 6.25% of the Fuller-Kesi area and 7.3% of the Umgusa area. The Umgusa area now forms part of the Gwaai Forest Reserve.

It will be observed that the Masue area suffered most. The chief reason for this was the difficulty of securing sufficient labour and what was obtainable was of poor quality. The most valuable of the forest area is that between Fuller and Kesi and special precautions were taken to protect this area. Such fire injury as did occur was confined to the poorer parts.

On account of the shortage of staff no steps could be taken to protect the forests in the Malindi-Intundhla working section. In this area many fires occurred unfortunately with great injury to the young regrowth in the areas cut over by Concessionaires.

Injury in the plantations at Mtao and Stapleford caused by animals was not of a serious nature. Spring hares, rats and mice do a certain amount of damage and every effort is made to reduce this to the lowest limits. Birds and mice at Stapleford destroy seeds in **in situ** sowings, and if this injury continues seedlings or transplants will be used. The B.S.A. Company plantations at Embeza suffered somewhat from ring barking caused by field rats. The trees subject to attack being Portuguese Cypress and Blackwoods.

Crickets and cut-worms are minor pests at both plantations. The borer, **Phoracantha semipunctata,** has unfortunately made its appearance in the Eucalypt plantations of the Rhodes Matopo Estate. The infestation is severe, but is confined to trees growing on inferior soils. Various species of indigenous forest trees are periodically defoliated by insects.

Injury from climatic causes is noticeable among exotic trees throughout the Colony where trees have been planted on shallow soils. At Stapleford where it is proposed to establish extensive areas of conifers, it is interesting to review the position after the first year's plantings. The District Forest Officer reports:— "The period July to mid-November proved to be the driest since rainfall records commenced ten years ago. The young plantations of conifers withstood the drought remarkably well, in particular **Pinus insignis.** In September and October **Cupressus lusitanica** showed the strain and apparently died off. After a few days' rain in November, however, the "dying off" revealed itself to be merely "dying back" and the young plants sent up new shoots with surprising vigour. The same occurrence may be recorded with **Cupressus torulosa.**

At Mtao the Eucalypts continue to show remarkable growth. Some **Eucalyptus maideni** were somewhat scorched by drying winds.

At Stapleford **Pinus insignis** is making remarkable growth and appears to be thoroughly at home. At the Embeza plantation near Penhalonga belonging to the British South Africa Company the tree was making no growth at all. An inspection showed that something was lacking in the soil. It was thought that an essential mychorhiza was absent. Inoculated soil from Stapleford has been supplied and the response of the young trees has been immediate. It is considered that no difficulty will occur in future in growing this tree at Embeza.

Buildings and Water Supply.—At Stapleford the foresters' quarters were completed. The veranda has been extended on the east side and an additional room 12ft. x 12ft. added on the west. A sawmill shed 30ft. x 20ft. with corrugated iron roof supported by wattle poles has been constructed. The old apple shed was converted into quarters for apprentices and six new huts and 21 huts replastered in the native compound. Temporary wattle-and-daub huts were erected in Block D for the forester and European builders. The officers' quarters in Block D are nearly completed. The building is being erected departmentally, but the funds were supplied under Public Works Department Vote. Adequate water supply arrangements are being made for all the buildings. At Fairfield (Mtao) an engine room has been built as well as a cattle shed. The floors of the forester's house have been laid with teak blocks and all doors and windows rendered mosquito-proof. Two huts were erected for married natives. The European Labour Station has been improved by the addition of 26 new huts built of brick with corrugated iron roofs. Rooms for a library and dispensary and a store room for vegetables erected. Various buildings have been kept in repair and additions made to the foreman's quarters.

At the eastern end of the Mtao Forest Reserve a new station has been established to be known as Eastfield. At this station the quarters for the District Forest Officer are being erected. Five huts, a store room and a stable have already been built. A well has been dug and will be equipped with a windmill which was formerly at the Fairfield station.

The Forest Nursery near Salisbury has a new office and storeroom, a stable for mules and new quarters for the assistants.

Roads.—All the roads on the Mtao Forest Reserve were kept in repair. No new roads were made. The Forest Nursery roads were kept in repair and some portions regravelled. The new Forest Reserve at Stapleford requires a number of roads. The more urgent ones are in process of construction. During the year a road 15ft. wide and 753 yards long was constructed from the Nursery to the Forester's house. On account of the steep slopes deep cuttings were required. To render the larger part of the Reserve accessible a road 3,353 yards long has been constructed from the Nursery to Stapleford Nek. The average grade is 1 in 18½. The road is equipped with bridges and culverts and has contour drains 594 yards long. The cost of the roads is £289 6s. 7d. per mile. In addition 5,974 yards of bridle paths have been constructed at a cost of £14 10s. 6d. per mile. All the roads and paths have been kept in repair as well as parts of the road to Penhalonga.

Telephones.—During the year a commencement was made with the construction of a telephone from Penhalonga to Stapleford, but at the end of the year it was not completed.

Livestock and Vehicles.—For the carrying out of the work of the Forest Service all stations are equipped with essential livestock and vehicles. The livestock on hand at the end of the year comprised: 166 oxen, 16 mules, 15 donkeys and 3 horses—in all 200 head.

Sylviculture.—The forests of the Kalahari sand areas flowered freely during the year and there is promise of a good crop of seed. A detailed study has not yet been made of the high forests on the Stapleford Forest Reserve. The plantations of exotic trees where these are sufficiently old regenerate themselves freely. Heavy germination of seed has taken place in a seven-year-old stand of **Cupressus lusitanica.**

The afforestation operations carried out during the year are shown in the following table:—

Station.	Area afforested at end of 1928. Acres.	Afforested during 1929.	Total area end of 1929.
Forest Nursery, Salisbury	36.50	—	36.50
Mtao Forest Reserve—			
(a) Fairfield	638.59	200.00	838.59
(b) European Relief Station	325.33	122.50	447.83
Stapleford Forest Reserve	45.00	688.91	733.91
Totals	1045.42	1011.41	2056.83

All the young plantations received attention. Blanks were filled in. At Stapleford no cultivation was carried out among the young trees but slashing of weed growth took place where it threatened to injure the young transplants. The slashing of weeds cost 2s. 6d. per acre. At Fairfield 484.25 acres and 449 acres at the Relief Work Plantation were hand weeded.

The methods followed in establishing plantations vary with the locality. At Stapleford, where there is a high rainfall, patch hoeing of the ground is the rule though strip and complete ploughing is also used. At the end of the year there was approximately 570 acres patch hoed and 160 acres ploughed—total 730 acres. At Mtao indigenous trees and shrubs are felled and when dry burnt on the area. Disc harrowing of the ground precedes planting. Considerable areas have been prepared and are ready for planting early in the ensuing year.

Nurseries and Sales of Seeds and Transplants.—The nursery at Salisbury is maintained for the distribution of seed, raising of seedlings and transplants of forest trees and ornamental plants. Plants are sold to the public and are also distributed for planting on Government ground throughout the Colony. During the year 875 persons visited the nursery. Advice is given by the Nurseryman on principles of nursery practice. Considerable improvements have been made to the water supply.

Nurseries are maintained at Mtao and Stapleford. The operations are summarised in the following tabel:—

Station.	Plants on hand 1st January.	Distributed or planted during year.	Raised during year.	Plants on hand 31st December.
Salisbury	246,500	349,147	592,893	490,246
Fairfield	348,214	568,298	709,084	489,000
Relief Station	208,500	353,010	386,190	241,680
Stapleford	700,000	635,500	911,400	975,900
...				
Totals	1,503,214	1,905,955	2,599,567	2,196,826

Sylvicultural Notes.—At all stations various minor operations for the improvement of the growing stock are carried out. In young plantations double leaders are removed. Thinning operations and pruning are carried out where deemed necessary. On both the Stapleford and Mtao Forest Reserves a large range of trees is being planted and careful notes made of the results obtained. When experimental plantings have had sufficient time to warrant conclusions being drawn notes in regard to each species will be published from time to time.

In the meantime the fact is recorded that excellent results are being obtained with many species of conifers.

Exploitation.—The work at Stapleford and Mtao is being concentrated on afforestation operations. It is hoped shortly to undertake a study of the indigenous timbers and when the values of various species have been determined to arrange for their exploitation. At Stapleford a small saw-mill operated by a Pelton wheel has been installed and various timbers are being sawn for departmental use.

On the Kalahari sand areas several Concessionaires under agreements with the Department of Lands continue exploiting timber. The District Forest Officer supervises operations and his frequent inspections have led to a great improvement in the management. Fewer logs are left in the forest and greater utilisation takes place in the saw mills.

The various saw mills operated by the Rhodesia Native Timber Concessions produce on an average about 800 railway sleepers per diem.

During the year the Falls Timber Syndicate ceased operations and the assets were taken over by the Zambesi Saw Mills, Ltd. The saw mills at Chababonda was closed down on the 28th September and is being dismantled. Many logs are still left in the forest near Chababonda. Felling operations are now taking place near "Westwood" farm. The Company proposes to transport the timber to the Zambesi River, thence across the river by pontoon and thence by rail to the saw mills at Livingstone.

The Concession granted to the Zambesi Saw Mills, Ltd., to cut timber on an area between Katuna and Kesi terminated during the year.

Revenue.—The revenue, including free issues to Government Departments, and apart from that paid to the Department of Lands by Timber Concessionaires in the Wankie, Bubi and Nyamandhlovu districts is as follows:—

Forest Nursery, Salisbury	£2,058 8 8
Mtao Forest Reserve	237 10 5
Stapleford Forest Reserve	410 7 11
	£2,706 7 0

Expenditure.—Expenditure incurred during the year apart from salaries and allowances is:—

Mtao Forest Reserve.	
Fairfield Patrol	£2,168 6 11
Eastfield Patrol	102 5 3
Stapleford Forest Reserve	4,063 15 0
Protection of indigenous Forests in Wankie, Bubi and Nyamandhlovu districts	846 2 11
Forest Nursery	1,243 18 11
	£8,424 9 0
European Relief Works on Mtao Reserve	7,688 3 2
	£16,112 12 2

Administration.—The staff of the Forest Service at the close of the year consisted of: 1 Forest Officer, 4 District Forest Officers, 1 Horticulturist and Nurseryman, 5 Foresters, 6 Apprentices and 1 Clerk.

The staff is distributed as follows:—

Salisbury:	1 Forest Officer. 1 District Forest Officer. 1 Clerk.
Forest Nursery:	1 Nurseryman Horticulturist. 1 Assistant. 1 Apprentice.
Mtao Forest Reserve:	1 District Forest Officer. 2 Forresters. 2 Apprentices.
Stapleford Forest Reserve:	1 District Forest Officer. 2 Forresters. 3 Apprentices.
Indigenous Forests, Kalahari Sands:	1 District Forest Officer.

Private Forests.—Advice by Officers of the Forest Service is given to all applicants and as opportunity offers the plantations belonging to farmers, public bodies, and Companies are inspected. Throughout the Colony tree-planting operations are taking place. During the year the Government gave financial assistance to the Arboricultural Society and by means of this aid large numbers of seedlings and transplants are being raised at various centres for distribution to farmers.

General.—The Officers spend an appreciable amount of their time in advisory work connected with forestry. Lectures are given at Farmers' Meetings and Agricultural Shows. Exhibits were staged at the Salisbury Show.

On the Forest Reserves meteorological data are collected and ecological notes made on all localities visited.

The apple orchard at Stapleford yielded 836½ cases which realised £397 17s. 11d.

During the year trout ova supplied to the Stapleford Reserve by the Umtali Branch of the Angling Society resulted in a number of young trout being liberated in the Odzani River.

The publications during the year consisted of a new price list and bulletins.

726. Farm Forest Practice.—Raising of planting stock.

729. Farm Forest Practice.—Choice of site and preparation of land.

736. Farm Forest Practice.—Sowing, planting and choice of species.

744. Farm Forest Practice.—Tending and care of young plantations.

763. Utilisation of wood, by T. R. Wilkinson, M.Sc., B.Sc., F.

J. S. HENKEL,
Forest Officer.

Annexure " K."

REPORT OF PLANT PATHOLOGIST

for Year ending December 31st, 1929.

General.—The principle feature of the year under review has been the large increase in the amount of routine and administrative work which has taxed the capacity of the division to the utmost.

Four hundred and thirty-seven lots of material have been received which have yielded 61 diseases not previously recorded in Southern Rhodesia (on 36 economic host plants) in addition to which a number of organisms have had to be discarded owing to the impossibility of finding time to test their pathenogenicity. One hundred and thirteen named sheets, mostly diseases of economic plants, have been added to the mycological herbarium.

The number of farms inspected during the year was one hundred and twenty-seven, including thirty-four visits to Government farms for the purpose of supervising experimental work. Ten lectures have been delivered; nine to farmers' Associations and one to the Executive of the Maize Growers' Association on the subject of Dry Rot **(Diplodia Zeae)**.

Publications.—The following articles have been published in the Agricultural Journal :—

"Investigations into Collar-Rot of Citrus." February.
"Blackfire of Tobacco." April.
"What is Diplodia in Maize?" June.
"Frog Eye Disease of Tobacco." August.
"Leaf Spotting of Tobacco caused by Mosaic." September.

Four short articles on potato, maize and tobacco diseases have also been contributed under the heading "Mycological Notes," a new feature commenced this year.

Two articles were written for the Press.

All the literature published has been written in popular language but at the same time a certain amount of technical information has been included, particularly where this applies to peculiarly local conditions, as it has been found that by this means farmers are able to familiarise themselves with the etiology of the more common crop diseases.

Tobacco.—The rainfall throughout the Colony has been above normal so that this season contrasts strongly with the past two years which were dry.

Despite prolonged periods of dull and wet weather neither angular spot **(B. angulatum)** nor wildfire **(B. tabacum)** was prevalent. This is attributed to the fact that seed disinfection is now almost universal. A serious leaf spotting, difficult to distinguish from angular spot, was, however, widespread on both light and heavy varieties, but was probably more severe on plants grown on sand veld. This disease appears to be identical with the blackfire of America and is considered to be a physiological disorder associated with slow growth and applications of nitrogenous fertiliser. A number of attempts to isolate **B. angulatum** from leaf spots failed and a close comparison of the lesions with those of angular spot disclosed several differences.

In confirmation of previous field observations it was found that White Mould **(Erysiphe cichoracearum)** infection was checked by heavy late rains and unusually warm nights. In general this disease was of minor importance and only became seriously destructive in districts which experienced the normal cold nights and dry conditions before reaping commenced. On the other hand, wet weather and overcast skies delayed ripening of the crop and favoured the development of Frog Eye **(Cercospora nicotianae)** which was responsible for much damage particularly from the black spotting which occurred during curing.

Mosaic was again of common occurrence in the lands and appears to be more widespread each year. It is also very common in seed beds but cannot usually be detected until the plants are ready for pulling, by which time infection is

likely to have spread over a considerable area. Often, especially if the plants are slightly chlorotic, the normal mottling of the leaf is indiscernible and the disease can only be detected by a few necrotic spots which usually appear in contact with the veins of the leaf. Infected plants are therefore easily overlooked and the disease is transferred to the lands. Tobacco which is allowed to stand after reaping becomes almost universally affected by mosaic and it is considered that this is an important source of infection since it is possible to find a certain number of plants infested by the aphis, **Myzus persicae,** and also because native labourers make their snuff and smoking or chewing tobacco from the suckers. Control of the disease by rogueing is successful only if carried out with extreme care so that preventive measures appear to be necessary.

Maize.—A close study of the local behaviour of Dry Rot (**Diplodia zeae**) has been made and the attention of growers has been directed to the losses caused by this disease by means of articles in the Agricultural Journal and the press. Much interest was evinced in the use of fungicidal dusts for dressing seed and despite the importation of several large consignments, the demand exceeded the supply up to the time of planting. The fact that importation had to be made from Europe combined with the unusual response of the farming community to recommendations for the use of fungicides account for this state of affairs. Eventually the majority of growers were supplied by the firm which handled the article whilst all maize seed distributed from the Government farms at Matopos and Gwebi were treated prior to sale.

Dry Rot of cobs was very severe throughout the country being favoured by the late rains experienced in most parts. The large maize districts, particularly the Mazoe Valley, were more seriously affected than the less closely settled areas but the average number of infected cobs amounted to 47.6 per cent. of the crops examined. A critical examination of cobs shewing slight infection at the tip indicated that no seed on such a cob could be assumed to be free from disease even though butts and tips were removed before shelling. Pot trials with this seed resulted in considerable improvement in germination and regularity of stand by using Tillantin R. dust as a seed dressing. Counts have also been made of unprofitable plants in the field which may be as high as 12-15 per cent. of the total stand. There seems to be little doubt that many of these plants grow from **Diplodia**—infected seed and receive a check at the beginning of the season from which they never fully recover. From all of which it is evident that far more attention needs to be paid to seed selection and to the prevention of cob infection by the destruction of old maize stalks, bearing numerous pycnidia, which can usually be found in any field having failed to rot down after being ploughed under.

Maize blight **(Helminthosporium turcicum)** caused complete destruction of crops in isolated instances and was present wherever maize was grown. The acclimatised varieties (Salisbury White, Hickory King and Potchefstroom Pearl) were little affected but other varieties, which thrive in a dry season, succumbed to the disease.

In conjunction with the Chief Agriculturist experiments were carried out on the biological control of witch weed **(Striga lutea).** Although it was possible to infect the weed with a disease, it was found that the plants produced seed before dying down so that further work along these lines was abandoned.

Potato.—Investigations were continued, in conjunction with the Chief Entomologist, upon degeneration diseases. The Up-to-Date variety was studied most closely but several others were examined for recognisable symptoms with the result that Mosaic, Aucuba Mosaic, Leaf Roll, Leaf Drop Streak, Stipple Streak and Crinkle have been recorded.

The typical degenerated Up-to-date plant in Rhodesia is a "curly drawf" but from experiments which are not yet complete it appears that the virus of this "curly dwarf" is closely associated with Crinkle.

Degeneration of "seed" is seemingly connected with storage conditions and appears to result from the presence of **Myzus persicae** upon the sprouting tubers. There seems to be little doubt that virus diseases alone are responsible for the "running out" of seed since as many as twelve successive healthy crops have been grown from imported tubers when "seed" has been carefully selected each year in the field and has been kept free from aphis infestation during storage. Investigations are being continued on these diseases.

Other diseases which were of common occurrence are Brown Fleck (~~Sprain~~ Spraing), Black Scurf **(Rhizoctonia solani)** and Early Blight **(Alternaria solani)** the latter being particularly destructive but was controlled effectively by those growers who sprayed regularly with Bordeaux Mixture.

Citrus.—Further work has been done on chlorosis and collar-rot and many observations made during periods of continued rainfall. So far no indications of bark disease caused by Phycomycetous fungi have appeared in the orange groves which were the subject of investigation last year, but there is strong evidence to support the view that soil moisture conditions to a large extent govern the incidence of root disease. Nutritional and other factors such as choice of scion/~~stock~~ stock combination, nursery selection, etc., are involved as is instanced by the susceptibility of Navel orange and the resistance of Valencia orange on the same stock (Rough lemon) to root disease caused by **Rhizoctonia.**

In connection with this work attention has been paid to a disease which appears to be identical with the so-called Dry Root Rot and is usually associated with water-logged conditions at certain times of year, i.e., poorly drained or impervious sub-soil. In a number of instances **Rhizoctonia bataticola (Macrophomina phaseoli)** has been found associated with the shredded bark and white, dry wood of the smaller lateral roots, the fungus having been shewn to be identical with that isolated from **Eucalyptus spp.** last year. This **Rhizoctonia** is distinct from that previously reported as causing severe root disease of Navel orange but both have been found on the same estate occurring under different conditions and producing identical symptoms on the aerial parts of the trees. Considerably more information is required upon this important subject and further investigations are proceeding.

Experiments upon the local storage of oranges have been commenced this year and on the whole the wastage from storage rots was not high. The greatest damage was caused by **Penicillium italicum** and **Oospora citri aurantii** but stem-end rot **(Alternaria citri)** and anthracnose **(Colletotrichum gloeosporioides)** were also common. **Penicillium digitatum** and **Cephalothecium roseum** occurred occasionally but caused no extensive damage. It is expected that better results will be obtained when an efficient ventilating system can be employed.

Cotton.—Internal rots have been shewn to be due to two wound parasites, **Epicoccum purpurascens** and **Alternaria sp.** by inoculation on both picked and growing bolls but a complete study of the diseases has not been possible owing to pressure of work in other directions.

Internal boll disease due to **Nematospora coryli** has been confirmed.

Beans.—Bean Mosaic has been found to be of common occurrence on both cultivated and wild species and is probably the cause of the failure to ratoon Jack beans.

Other Crops.—The more important diseases recorded include: **Rhizoctonia bataticola** on grape fruit, Mango and **Pittosporium**, **Cercospora coffeicola** on Coffee, **Septoria apii** on celery, **Podosphaera leucotricha** on apple, **Erysiphe graminis** on barley, **Oidium quercinum** on oak, **Puccinia graminis and P. triticina** on wheat, **Gloeosporium papayae** on Paw-paw and an undetermined virus disease of tomato.

FIELD EXPERIMENTS.

Tobacco.—Experiments on the control of white mould **(Erysiphe cichoracearum)** by the use of sulphur applied to the soil were again carried out at the Tobacco Experiment Station but indefinite results only were obtained, chiefly because the season was not favourable to the development of the disease.

A full description of the work is being prepared for publication in the Agricultural Journal.

Potatoes.—Good control of Early Blight **(Alternaria solani)** was obtained by spraying with Bordeaux Mixture particularly on the late planted imported seed.

ECONOMIC BOTANY.

Wheat.—A number of varieties were planted out in chess-board plots with the aid of a suitable planting plate and dibber under careful supervision and despite the handicap of unskilled native labour, good even stands were obtained. Daily observations were kept upon all varieties to observe their behaviour under summer conditions and a large number of reciprocal crosses were made with the most promising. Considerable resistance to rust was observed in several of the wheats whilst a few produced an unexpectedly good grain and high yield. It appears that there is good material on hand for bringing about a great improvement in the locally grown crop.

Maize.—A preliminary investigation into the so-called " Pinking " of the grain has yielded more or less definite results in the first year. The technical assistant who carried out the work has shewn that two forms of pinking exist, i.e., the hereditary red pigment characteristic of certain varieties and a pink flush caused by the action of sunlight on some substance in the hull of the seed. Cobs which were incompletely covered by the husk developed the pink colour on the exposed grains. In the former type it was found that plants segregated for colour and also for length of cob producing an undesirable, long, tapering ear with starchy, shallow grain.

Plants were selfed and a number of crosses made. The F1 plots have been planted.

Two articles have been written for the Agricultural Journal.

Miscellaneous.—Four weeks were spent in conducting Mr. Trench of Kenya, through the Eastern districts and the Mazoe valley to report upon the prospects of coffee growing.

A revised list of plant diseases occurring in the Colony has been compiled and will be published shortly.

The Mycology exhibit at the Salisbury Agricultural Show was considerably enlarged this year and aimed chiefly at popularising the use of fungicides.

Early in the year the Botanist resigned and since then systematic botany has been in abeyance.

A number of members of the British Association visited the laboratory during their stay in Salisbury and discussed matters of interest.

In conclusion, I wish to thank those officers of the department who have co-operated with me in certain investigations and to express appreciation of the valuable assistance accorded by the Director of the Imperial Bureau of Mycology, without which it would not have been possible to find time for much of the work attempted during the year.

J. C. HOPKINS,

Plant Pathologist.

Annexure " L."

ANNUAL REPORT OF THE STOCK ADVISER

For the Year ended 31st December, 1929.

It is regretted that owing to the large amount of office work and work in connection with the purchase of animals on behalf of farmers, I have been unable to comply with all the requests for visits to individual farmers received during the past year. It will be realised that the work of valuing cattle in connection with outbreaks of African Coast Fever, the investigation and reporting on farms and stock for the Livestock Loan Fund Scheme, the examination and passing of cattle suitable for export to England and the increasing demand for my services in connection with the purchase by farmers of all kinds of livestock, leave very little time for extended tours.

Nevertheless, I have been able to keep in touch with the livestock industry as a whole, and it is with pleasure that I can report that the industry is in a better position now than it was when I joined the Department of Agriculture in 1926.

Cattle.—The outstanding feature in the year under review is the large influx of new blood into the Colony due to importations of pedigree animals from the United Kingdom and the Union of South Africa.

Acting on instructions, I proceeded to England in December, 1928 for the purpose of purchasing pedigree livestock for the Government and for private farmers. The breeds purchased on behalf of the Government were :—

2 Shorthorn bulls and 10 heifers.
2 Red Poll bulls and 13 heifers.
2 Ayrshire bulls and 10 heifers, and
1 Jersey bull and 10 heifers.

The Shorthorns are of the beef type and are stationed at the Government farm, Gwebi. The other three breeds are at present at the Government Farm, Matopos. The animals were selected from some of the best herds in the United Kingdom ; particular attention being paid to the milk and butterfat records of the dairy breeds. In addition, I purchased 50 head of cattle and two Suffolk Down rams on behalf of 23 private individuals. The breeds represented were :—

Shorthorn.
Sussex.
Hereford.
South Devons.
Ayrshires, and
Red Polls.

With the exception of one Shorthorn heifer, which died in the London Quarantine Station, all the animals purchased arrived at Cape Town safely. One Ayrshire bull and one Red Poll bull re-acted to the Tuberculin Test at the Quarantine Station at Cape Town and were destroyed by the Veterinary Authorities of the Union of South Africa. After being quarantined at the Cape Town docks for 30 days, the animals were railed up country and it is gratifying to report that they arrived at their destination in good condition considering their long journeys and the lengthy periods spent in quarantine stations.

December, January and February are not the best months of the year to purchase cattle in England. It is necessary to visit many herds before definitely deciding on which animals to purchase and as the days are short at this season, few herds can be inspected each day. Young bulls are generally stable fed and properly handled, but heifers are mostly wintered out and are seldom handled when young. Animals that are wintered out are more subject to skin diseases on the sea voyage and they are often infected by lice and warbles on arrival at Cape Town. I consider the most suitable months to purchase cattle in the United Kingdom for export to this Colony are April, May and June.

The animals purchased in England were brought out in five shipments, on board the

s.s. " Harmodius."
s.s. " City of Agra."
s.s. " City of Oran,"
s.s. " Dromore Castle,"
s.s. " Ripley Castle,"

under the scheme whereby the Empire Marketing Board and the Government of Southern Rhodesia pay freight and railway charges.

A further 32 pedigree bulls and heifers were imported privately at the same time under this scheme, making a total of 135 head of pedigree stock imported into the Colony from the United Kingdom during the year under review.

Since their arrival in the Colony, ten of the 100 head purchased by me have died, viz., 4 Red Poll heifers and two Ayrshire heifers and one Jersey heifer at the Matopo Farm, one Red Poll heifer belonging to Messrs. Currie & Plevins and 2 Sussex bulls at the Veterinary Laboratory during their inoculation against Redwater and Gall-sickness. All the others are doing well and have improved in condition.

The fresh blood thus introduced by these importations should greatly improve the beef and dairy herds in the Colony, since it is the policy of the Government to submit annually for sale by public auction any young bulls bred from these imported cattle.

These importations from the United Kingdom do not, however, represent all the new blood introduced into the Colony during the year, for on my return to South Africa I attended the pedigree cattle sales at Johannesburg and Bloemfontein in September and purchased some 200 head of breeding stock for individual farmers. It will be of interest to note that, with the exception of the Orange Free State, Southern Rhodesia was the largest purchaser of cattle at these sales.

My attendance at stud sales enables farmers, who cannot afford either the time or the expense of visiting the Union, to procure good animals at the least possible cost.

In addition to cattle bought at Stud Sales, a large number of dairy cattle were imported, many of which were obtained through the agency of this branch of the Department.

The figures furnished by the Veterinary Department shewing the importation of breeding stock into the Colony are given hereunder :—

Year.	Bulls.	Cows & Heifers.
1926	405	611
1927	383	1,032
1928	608	1,085
1929	501	1,671

(a) **Dairy Stock.**—During the year a large number of dairy stock have been imported under the Government Livestock Loan Scheme and otherwise. The importations from the Union of South Africa and the United Kingdom indicate that breeders in this Colony are taking a live interest in their cattle and the results of this introduction of new blood will be a general improvement in the quality of the cattle throughout the Colony in a few years' time.

Owing to the slump in tobacco many farmers are now adopting the practice of mixed farming and consequently the demand for dairy stock has been in excess of the supply, with the result that high prices are ruling for this class of animal. Many of the younger settlers have had little or no experience in the management and feeding of dairy stock of the quality imported from the Union of South Africa, and it is, therefore, desirable that they start with animals bred in and thoroughly acclimatised to the Colony. Experience can thus be gained with less financial risk. If bulls with official milk and butterfat records are used a useful type of animal can be produced which will always find a ready market.

(b) **Ranching Stock.**—With an average rainfall well distributed over the Colony, the grazing was excellent in most districts and cattle remained in good condition throughout the winter months with comparatively few losses from poverty. Farmers are gradually beginning to realise the importance of providing winter feed for their stock, but there is room for improvement in the provision of water on many ranches. The value of a stock lick is also not realised by many stockmen. The formula for a very good stock lick can be furnished to any farmers interested by the Veterinary Department, and all ranches in particular are urged to pay more attention to this by no means expensive addition to their animal's diet.

During the year, the prices of slaughter stock have had an upward tendency and with the developments of the north the prospects of being able to obtain firm prices for good slaughter and breeding stock remain good.

The total number of cattle exported for the year were 73,615 head, which is an increase of 2,186 head over the amount exported during 1928. The present markets, excluding the local market for Southern Rhodesia cattle, are :—

(a) The Johannesburg quarantine market for slaughter cattle over the embargo weight;
(b) the market in the South African Union for underweight cattle which are slaughtered for an overseas market;
(c) live cattle shipped to England;
(d) slaughter cattle for the Congo markets;
(e) breeding cattle for the Congo;
(f) breeding and slaughter cattle for Northern Rhodesia;
(g) slaughter, trek and breeding cattle for Portuguese East Africa.

It is interesting to note that, although the supplies to market (a) shew a decrease, yet the numbers sent to (c) shew an increase.

Unfortunately, among the 695 head sent to this market were a number of totally unsuitable cattle, and should this foolish practice of exporting such stock continue, it cannot but damage the good name of Southern Rhodesian cattle, established at some cost and a good deal of trouble by certain exporters. When it became known that cattle unsuited to the English market were being shipped overseas, the Government laid down that only such cattle as were passed by the Stock Adviser as fit for the trade could qualify for the export bounty granted by the Government for cattle exported to England on the hoof.

It is hoped that further exportations of cattle on the hoof will be made this year to the English market. If fairly large numbers of cattle can be shipped at regular weekly intervals over a period of, say, three months when supplies of live-stock from other sources are low, returns from this trade will be equally as good, if not better than, those obtained from cattle sent to the Johannesburg market.

The magnitude of the Congo market is shewn by the following figures :—

	Slaughter.	Breeding.	Total.
1928	26,833	5,701	32,534
1929	23,956	7,959	31,915

It is possible that in the near future larger quantities of cattle will be required for this and Northern Rhodesian markets. In this connection the continued slaughter of many good breeding cows, to which attention was drawn in 1927, is to be deprecated. Although the statistics for 1929 are not yet available, it is anticipated that they will shew very little, if any, increase in the number of European owned cattle.

An interesting development in the cattle trade is the formation of a Company by a number of Mashonaland farmers who are not actually cattle breeders, to purchase, store cattle and feed them on their farms for the fat stock markets. The Company assists farmers who are unable to put down the cash for cattle to obtain a loan to enable them to do so until the cattle are sold. The ranchers get an additional outlet for cattle and the grain growers an outlet for surplus food stuffs and an opportunity to increase their manure pits.

Native owned cattle shew an increase in quantity but not in quality with the exception of cattle in certain Reserves. As a rule, however, not sufficient attention is being paid to improving the standard of native cattle by the introduction of good bulls and some Reserves are becoming considerably overstocked. Reports indicate that, generally speaking, this has been a good calving season.

Sheep.—The importation returns indicate that there is a very good local market for mutton sheep. No less than 25,985 sheep and goats were imported for the past twelve months. The mutton sheep, e.g., Black Head Persian or Cross-breds by Suffolk Down or Romney Marsh rams do well in practically all districts in the Colony, given fair and reasonable attention. If farmers kept small flocks of mutton sheep the need for importing mutton sheep would soon disappear. The keeping of such flocks would also serve as an indication to the farmer as to whether he could branch out and keep woolled sheep. The grazing in this Colony is of such a nature that both cattle and sheep can be kept in the same paddock with advantage to both. The cattle keep the long grass down to the benefit of the sheep.

As regards woolled sheep, the Department is very keen to foster this industry, and it is my considered opinion that in certain areas woolled sheep can profitably be maintained provided that they are given the necessary close attention. One of the most promising districts for this class of farming appears to be the Melsetter district. The following figures indicate the activities of the sheep farmers in that district :—

(a) Number of farmers owning sheep	43
(b) Number of sheep	11,650
(c) Prices for wool	9½d. to 13d.

Southern Rhodesia is fortunate in having had a visit from Dr. Nichols of the Empire Research Board who spent a few weeks touring the more accessible sheep districts of the Colony, and his report will be looked for with interest. He confirms the opinion that I have held for some time that New Zealand Romney Marsh sheep should do well in many of the higher and wetter areas of the Colony.

The Merino sheep experiments initiated by the Government have served a useful purpose in that they have indicated that the Merino is not a breed which will do well unless tended by experienced sheep men. The results obtained by experienced men have, however, been quite satisfactory, and it is hoped that further sheep stations will be established in the near future.

Goats.—Goats, though not favoured by farmers, should find a ready market for the importation figures shew that no less than 6,000 (?) goats were imported into the Colony for the period January to October, 1929.

Pigs.—With the increased attention which is being paid by the small farmer to dairying, it is only natural that the demand for breeding pigs increases. The lack of new blood in the Colony and even in the Union of South Africa is being felt, and it is gratifying to report that the Government are importing a few pedigree Large Whites and Large Blacks from England. These are the breeds which, crossed with Large Blacks and Large Whites, respectively, are considered to produce the most uniform sides and the best bacon. This importation will enable farmers to obtain the much needed new blood by purchasing breeding pigs from the Government.

As I have already pointed out, not enough attention is paid by the majority of pig keepers to the conditions under which pigs are kept in this Colony. Pigs require shade and cleanliness above all things, especially when they are young, and these points are not fully appreciated by many pig keepers.

W. FLEMING,

Stock Adviser.

Annexure "M."

REPORT OF THE EDITOR "RHODESIA AGRICULTURAL JOURNAL" FOR THE YEAR 1929.

The purpose of the Rhodesia Agricultural Journal is to establish a link between the Department of Agriculture and the farmers of the Colony and by practical advice to advance the agricultural industry in every way possible. There is clear evidence that this object is being achieved and the Journal has undoubtedly been a great help to farmers generally, especially to those who have little knowledge of farming and to those who are new to the Colony. Articles have now appeared at one time or the other covering practically every phase of agriculture as practised in the Colony and it is the endeavour to present this information in language which can be easily assimilated by all. The results of the experimental and research work carried out by the Department of Agriculture on behalf of the farming community are recorded in the pages of the Journal and every endeavour is made to keep farmers abreast of the times in so far as modern developments in the science and practice of agriculture are concerned. The task of producing a monthly Journal in such a small community as ours means frequent calls upon the scientific staff of the Department but through their loyal co-operation the standard of production has been fully maintained.

The number of subscribers during the year has decreased somewhat, due, it is thought, to the set-back in the tobacco growing industry, and 2,300 copies were printed in December, 1929 as compared with 2,500 earlier in the year. The number of subscribers at the end of the year was 1,683, some of whom are situated in the neighbouring territories. A comparatively large number of copies of the Journal are exchanged with agricultural institutions in various parts of the world and by this means the Department is able to obtain literature of great value from a wide source. The subscription to the Journal is only 5/- per annum which should bring it within the means of every farmer, but unfortunately there are those who, in spite of the utmost latitude given, neglect to renew their subscriptions when they become due.

There has been a slight increase in the revenue from advertisements and subscriptions during the year, the amount received being £1,251 5s. 10d. as compared with £1,214 17s. 3d. in 1928. The cost of printing the twelve issues of the year including bulletins, was £1,971 13s. 8d. as compared with £2,394 18s. 2d. in the previous year.

The bulletin service continues to be taken advantage of and has been particularly helpful to new settlers. To residents of the Colony these bulletins, which are reprints of articles that have appeared in the Journal are supplied free, but to non-residents of the Colony a charge of 3d. per copy is made. There are available at the present time 360 bulletins dealing with a wide variety of subjects and this list is being augmented monthly.

WILLIAM E. MEADE,
Editor,
Rhodesia Agricultural Journal.